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SPECIAL REPORT ON CERTAIN RAILWAYS OF SOUTH-WEST GERMANY

INTER-SERVICE TOPOGRAPHICAL DEPARTMENT

I.S.T.D./C/317

I.S.T.D. SPECIAL REPORT

ON

CERTAIN RAILWAYS

OF

SOUTH-WEST GERMANY.

INTER-SERVICE TOPOGRAPHICAL DEPARTMENT.

January, 1944.

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CERTAIN RAILWAYS IN SOUTH-WEST GERMANY

INTRODUCTION

This report deals with certain selected railway lines in South-West Germany, particularly routes from the frontier to the following areas :—

(1) Koblenz, Wiesbaden, Mainz, Frankfurt.

(2) Saar, Karlsruhe, Stuttgart, München, Nürnberg. The close network of lines in the Saar region is dealt with in rather more detail than the rest of the area.

(1) Map of System

A map of railways in the area covered by this report is attached, showing :—

(a) Gauges.
(b) Single and double track lines.
(c) Electrically operated lines.

A diagram is also provided, showing the route numbers of the lines described.

(2) General Description of System

The lines described in this report are contained in the following railway divisions :—

SAARBRÜCKEN
MAINZ
FRANKFURT
KARLSRUHE
STUTTGART
AUGSBURG
MÜNCHEN
NÜRNBERG
WÜRZBURG

The area bounded by Saarbrücken, Mainz, Frankfurt, Stuttgart, Karlsruhe, is heavily industrialized and is covered by a close network of railway lines. The remainder of the area is mainly rural except for a few large towns, but its railways carry heavy traffic, since they mostly converge on München, the great railway bottleneck for traffic to Austria and Italy. Karlsruhe is another important centre for traffic to Switzerland and E. France.

The area lying north of this is dealt with in the report on certain railways of North-West Germany, with approaches from Rotterdam and Antwerp (I.S.T.D./C/316).

(3) Organization and Personnel

(a) ORGANIZATION

The great majority of the railways in Germany (and in the area covered by this report) are under the control of the Deutsche Reichsbahn, or German State Railway. The functions and responsibilities of the principal elements of the organization are as follows :—

Minister of Transport and General Manager of the German State Railway (" *Reichsverkehrsminister and Generaldirektor der Deutschen Reichsbahn* ").

Since 1937, the appointment of Minister of Transport has been merged with that of General Manager of the State Railway. On the one hand, as Minister, this official is directly responsible to the Führer and Reich Chancellor for the general control, regulation, and inspection of all means of transport (including the railways) in Reich territory; on the other hand, as General Manager of the Reichsbahn, he is the highest authority in the technical, operational and economic management of the State Railway system. By vesting both these functions in a single office the German Government thus ensured its complete control over both the policy and the actual working of the whole railway system.

State Secretary of the Ministry of Transport and Deputy General Manager of the German State Railway (" *Staatssekretär im Reichsverkehrsministerium und Stellvertretender Generaldirektor der Deutschen Reichsbahn* ").

As implied by his title, this officer is the deputy and assistant to the Minister and General Manager in both facets of his work. It is noticeable that, in practice, the State Secretary has become largely concerned with the maintenance of contacts between the Reichsbahn and other forms of transport on the one hand, and the public and outside bodies on the other; he frequently represents the Ministry and State Railway at official conferences and functions, and generally relieves the Minister of secondary duties which might interfere with the latter's primary work of control and management.

Advisory Committee of the German State Railway (" *Beirat der Deutschen Reichsbahn* ").

This body was formed to " advise the Minister of Transport on fundamental and important railway questions," and superseded the Verwaltungsrat, or Administrative Council, of the old Reichsbahn-Gesellschaft in 1937. It includes influential representatives of industry, trade, and public life throughout the Reich; the Committee has always been purely advisory and has had no executive powers, but the recent co-option into it of such important Government officials as the Minister of Armaments and Munitions, the Inspector-General of the Luftwaffe, the Führer's Deputy, the Director-General of Labour, and the leader of the Labour front, and the increase of membership to 18, would seem to reflect the German Government's recognition of the absolutely vital part played by railway transport in Germany's war strategy, and of the need for the closest co-operation between the Reichsbahn and all branches of the Government, the armed forces, industry and trade. As now constituted, therefore, the Beirat may in practice have considerable influence in the determination of priorities.

Railway Departments of the Ministry of Transport (" *Eisenbahnabteilungen des Reichsverkehrsministeriums* ").

The Ministry (at Berlin) includes the following railway departments :—

(i) Traffic and Rates Department (" *Verkehrs- und Tarifabteilung* ").

(ii) Operating and Civil Engineering Department (" *Betriebs- und Bauabteilung* ").
Sub-department IIA—Civil Engineering (" *Bauabteilung* ").

(iii) Mechanical Engineering and Purchasing Department (" *Maschinentechnische und Einkaufsabteilung* ").

(iv) Financial and Legal Department (" *Finanz- und Rechtsabteilung* ").
Sub-department IVA—Legal (" *Rechtsabteilung* ").

(v) Staff Department (" *Personalabteilung* ").

In addition there are two " Gruppen " (" groups ") in the Ministry, dealing respectively with general administrative questions (" Gruppe A ") and military transport (" Gruppe L ").

The head of each of the railway departments has the title of *Ministerialdirektor* (Ministerial Manager), and is responsible to the Minister in a general way for the work falling within his section. This does not mean that his position is analogous to that of a Chief Officer or Departmental Manager in

British railway practice; since the Reichsbahn organisation is essentially "divisional" rather than "departmental" in character, the position of a Ministerialdirektor is more strictly comparable to that of a Vice-President or Assistant General Manager on a British railway.

Together with the Minister and the State Secretary, the Ministerial Managers form a *Vorstand* (Executive Committee) under the chairmanship of the Minister; this body constitutes a small but effective executive nucleus for the whole system.

Chief Audit Office ("*Hauptprüfungsamt*").

The head of this office is responsible to the Minister, but otherwise the office functions independently, without interference from other railway departments. The Chief Audit office controls and delegates its lower functions to subsidiary Audit Offices working with the local Railway Divisions and the Railway Central Offices.

State Railway Divisions ("*Reichsbahndirektionen*"; *abbreviated* "*R.B.D.*").

These are the geographical divisions of the system, and they constitute, in effect, the broad basis of the whole organisation of the Reichsbahn. At the beginning of 1938 (before the increase in their number resulting from German territorial acquisitions), these Railway Divisions numbered 26 in the whole Reich. As mentioned in paragraph 2 above, the Railway Divisions in the area covered by this report are the Saarbrücken, Mainz, Frankfurt, Karlsruhe, Stuttgart, Augsburg, München, Nürnberg divisions.

It is reported (20/11/43) that owing to severe damage to the R.B.D. offices in Essen, Hamburg, Wuppertal and Köln, the staffs of these four railway administrative centres were, together with those of Kassel and Karlsruhe, to be housed in premises at Linz, formerly occupied by the R.B.D. Linz, whose staff is moving to a place south of the Tauern Tunnel, believed to be Mallnitz in Carinthia. R.B.D. Mainz is also reported to have moved to Bad-Münster.

The Railway Divisions were evolved in their present form after many vicissitudes, and though they vary somewhat in route length and extent of traffic, they now have a common form of internal organisation. As a result of considerable decentralisation of authority by the Ministry, the R.B.Ds. exercise very extensive powers in their respective areas, and have a comparatively free hand in the local development, control, and operation of traffic. At the head of each Division is its *Präsident* (President), whose position is similar to that of a Divisional General Manager in British railway practice. The R.B.D. Presidents are responsible directly to the Minister and maintain regular contact with the Railway Departments of the Ministry; they also hold regular Presidential Conferences under the chairmanship of the Minister, where their common general policy is formulated.

One in every three of the Divisions has additional sections of its management dealing with the control of major workshops not only in its own Divisional area, but also in the two neighbouring Divisions (*e.g.*, the Workshops Section of the Köln Divisional management controls all the principal workshops not only in the Köln Division area, but also in the Essen and Wuppertal Division areas).

The regional control of the various lines forming a R.B.D. is carried out through "*Amtsvorstände*" (District Offices), *i.e.*, *Betriebsämter* (District Operating and Engineering Offices), *Verkehrsämter* (District Traffic Offices), and *Maschinenämter* (District Mechanical and Running Offices). The District Officers in charge of these offices are directly responsible to the R.B.D. management and they supervise and direct the work of local "*Dienststellen*" (Service Points), *i.e.*, *Bahnhofen* (Permanent Way Sections), and *Betriebswerken* (Running Depots). Details of the organisation of the various Amtsvorstände and Dienststellen are given below.

District Operating and Engineering Offices ("*Betriebsämter*").

The average length of line controlled by a Betriebsamt is approximately 180 route kilometres (about 110 route miles). In view of the nature of his combined duties, the District Officer in charge of each Betriebsamt is a trained Civil Engineer. The Betriebsamt deals with the maintenance of way and works (including signal and telegraph equipment) on the one hand, and train operating, etc., on the other.

District Traffic Offices ("*Verkehrsämter*").

A Verkehrsamt covers, on an average, a route length of line of about 470 kilometres (about 300 route miles), or nearly three times as much as that covered by a Betriebsamt. Despite this, the total number of staff controlled by a Verkehrsamt is much smaller than that of a Betriebsamt. The Verkehrsamt deals with general commercial matters, claims, the control of ticket inspection, etc.

District Mechanical and Running Offices ("*Maschinenämter*").

In general, a Maschinenamt corresponds to a District Locomotive Superintendent's Office in British railway practice, though it also deals with technical (mechanical) questions involved in the running of carriage and wagon stock in its area. The average length of line covered by a Maschinenamt corresponds closely to that of a Verkehrsamt. The District Mechanical and Running Superintendent controls the Locomotive and Rolling Stock Running Repair Shops ("*Betriebs-und Betriebswagenwerke*") and the Locomotive Depots in his area; he has no direct connection with the Main Repair Shops ("*Ausbesserungswerke*") which, as mentioned above, are controlled directly from certain of the R.B.Ds.

New Works Offices ("*Neubauämter*").

These offices are set up for the execution of large-scale civil engineering works which cannot be effectively supervised by the District Operating and Engineering Officers.

Survey Offices ("*Vermessungsämter*").

Each R.B.D. has a Survey Office comprising a fully qualified staff of surveyors.

Main Railway Repair Shops ("*Ausbesserungswerke*")

As mentioned in the description of the R.B.Ds. given above, the administration of these Main Repair Shops is carried out by selected R.B.Ds. known as "*Geschäftsführende Direktionen für das Werkstattenwesen*" (Administrative Divisions for Workshops). The local management of each Ausbesserungswerk is in the hands of a Werkdirektor (Works Superintendent). A list of Ausbesserungswerke in the area covered by this report is given in paragraph 8 (c) below.

Permanent Way Sections ("*Bahnmeistereien*").

There are on an average about eight Permanent Way Sections under the control of each Betriebsamt, the average route length of each Permanent Way Section being approximately 23 kilometres (14½ route miles). The Bahnmeister (Permanent Way Inspector) in charge of each section is held responsible to a high degree in an executive capacity for its maintenance, the gangers being correspondingly relieved of most such responsibility.

Stations (" *Bahnhöfe* ")

Stations are graded into four classes, according to their size and importance. In addition, there are " *Haltepunkte* " (halts or minor stations) and " *Haltestellen* " (stopping points or local halts).

A 1st Class Station may be administered by four officials—a Station Master, a Chief Booking Clerk, a Parcels Agent, and a Cashier. The Station Master is responsible to the Betreibsamt for the actual operation of the station, while the other three officials are responsible to the Verkehrsamt for the commercial work. At 2nd Class Stations, the appointments of Cashier and Chief Booking Clerk may be combined, operating and parcels work remaining under separate heads; or alternatively, the position of Cashier may be kept separate, and booking office and parcels work amalgamated under a single chief. At 3rd Class Stations, the division between the operating and commercial functions is still generally maintained, the whole commercial work being controlled by one man, while operating remains in the hands of the Station Master. In the case of 4th Class Stations, all functions, commercial and operating, are controlled by a single official.

According to a report dated 19th November, 1943, the German railways have introduced a number of mobile stations with the necessary equipment to operate in the bombed areas until normal conditions have been restored. It has not been possible to ascertain the extent of the use of these mobile stations.

Main Goods Stations and Parcels Offices (" *Selbstständige Abfertigungstellen* ").

These are rated as " independent " in that they are not controlled from the Bahnhöfe, but direct from the Verkehrsämter; this corresponds to British railway practice, in which the larger goods stations are similarly controlled direct from the District Traffic Managers' Offices.

Locomotive Running Depots and Rolling Stock Shops (" *Betriebs-und Betriebswagenwerke* ").

There are on an average four or five of these depots and shops under the control of each Maschinenamt; the main Railway Repair Shops (*Ausbesserungswerke*) have no control over them. A list of the Locomotive Running Depots (*i.e.*, Engine Sheds, Roundhouses, etc.) in the area covered by this report is given in paragraph 8 (*c*) below. The Locomotive Running Depots, and Carriage and Wagon Depots, are managed by Shed Foremen as in Great Britain.

State Railway Central Offices (" *Reichsbahn-Zentralämter* ").

There are two of these Central Offices, located respectively at Berlin and München (Munich). They deal centrally with questions of stores, purchases, technical design and development, etc., for the whole of the Reichsbahn. Subsidiary to these Central Offices are several Stores Receiving Offices (" *Abnahmeämter* ") and Test Offices (" *Versuchsämter* ").

General Operating Control Offices (" *Generalbetriebsleitungen* ").

There are three of these offices in the Reich (at Berlin, Essen and München), and they deal with operating questions of a wider scope than can be covered by the R.B.Ds., such as arranging schedules for long-distance through goods services, the allocation of goods wagons to R.B.Ds., and the use of marshalling yards for traffic passing beyond divisional boundaries. Before the present war they were known as " *Oberbetriebsleitungen* " and ranked in importance with the R.B.Ds., but they have since been given their present title, and their status has been raised, empowering them to issue orders to the Divisional Managements.

In addition to the various elements of the Reichsbahn organization described above, there are also centralised sections dealing with such subjects as Publicity, Electrification, etc.

Also, since the outbreak of the present war, new offices have been set up in Germany to allocate traffic between the various forms of transport; they are known as Central, Regional, and District Traffic Offices, and there is also now a Central Goods Directing Office dealing with questions of priorities and loading space.

Private railways in the area of this report are not generally of more than local importance.

(*b*) PERSONNEL

The average number of personnel employed by the Reichsbahn during a typical pre-war year (1936) was 659,943, made up as follows:—

	Percentage of total staff
	%
Administrative Staff	7·0
Railway Maintenance Staff ...	12·6
Line Inspection Staff	4·6
Operating and Despatch Staff ...	34·1
Train Crews	6·8
Locomotive Staff	10·5
Main Repair Shops' Staff	13·5
Running Depot and Technical Staff	10·8
Marine Staff	0·1

The Reichsbahn staff is divided throughout into two classes—Officials (" Beamte ") and Workmen (" Arbeiter "). This division is not strictly comparable to that between Salaried and Wages staff in British railway practice. It is actually a division between permanently appointed staff with pension rights, and non-appointed staff.

The technical training of German railway personnel is normally of the highest order, and the German has proved himself to be by nature a conscientious, competent, and highly efficient railwayman; the standard of engineering workmanship, inspection, and operation on the German railways ranks with the best in the world.

Since the outbreak of war, however, heavy demands have been made on the Reichsbahn for the provision of trained railwaymen for the German Army transportation service and for the operation and control of railways in German-occupied territories. These demands have been particularly severe in the case of the railways of occupied Russia, where German railwaymen have had to be provided not only to supervise the conversion of track to the standard European gauge, but also to carry on practically the whole work of railway operation in all areas not directly behind the fighting fronts.

As a result of the loss of such a considerable proportion of its regular staff, the Reichsbahn has had to make up the deficiency wherever possible by the re-employment of retired railwaymen, the drafting of foreign railwaymen (*e.g.*, French and Belgian) into Germany, and the engagement of large numbers of female and juvenile workers. In April, 1943, the number of women employed by the Reichsbahn (in both administrative and train operating work) was reported to exceed 100,000, and as this number was evidently insufficient, more were stated to be in course of enlistment.

All these large-scale staff changes will have implied a certain reduction in morale and efficiency, but despite this, the general standard may still be taken as relatively high.

(4) Length of System and Gauges

(a) Length by Gauges

At the end of 19[illegible] (*i.e.*, before the incorporation of the Austrian Federal Railways into the Reichsbahn) the total length of the whole Reichsbahn system was as follows :—

Route length—	km.	(miles)
Single track line	31,476	(19,558)
Double track line	22,392	(13,914)
Triple or multiple track line	654	(406)
Total Route Length	54,522*	(33,878)

* Of this figure, 98·6 per cent. is of the standard European 1·435 m. (4 ft. 8½ in.) gauge, and only the remaining 1·4 per cent. (or about 780 route km.) consists of narrow-gauge line (1 m. and 0·75 m.).

Track length—	km.	(miles)
Running tracks	78,775	(48,948)
Other tracks (sidings, spurs, etc.) ...	45,174	(28,070)
	123,949	(77,018)

(b) Loading and Structure Gauges

The standard gauge lines of the German State Railway conform to the general loading gauge (Lademass I) of the Union of Central European Railway Administrations ("Verein Mitteleuropäischer Eisenbahnverwaltungen").

A full diagram of both the loading and structure gauges applicable to the standard gauge German lines is attached as Fig. 2. The main dimensions of these gauges are as follows :—

	mm.
Loading Gauge—	
Maximum width from 430 mm. (1 ft. 5 in.) to 3,500 mm. (11 ft. 6 in.) above rail-level	3,150 (10 ft. 4 in.).
Maximum width at 3,805 mm. (12 ft. 6 in.) above rail-level	2,700 (9 ft. 2 in.).
Maximum width at 4,690 mm. (15 ft. 3 in.) above rail-level	1,380 (4 ft. 6½ in.).
Maximum height above rail-level ...	4,650 (15 ft. 3 in.).
Structure Gauge—	
Minimum width from 760 mm. (2 ft. 6 in.) to 3,050 mm. (10 ft. 0 in.) above rail-level	4,000 (13 ft. 1½ in.).
Maximum width at 3,800 mm. (12 ft. 5½ in.) above rail-level	3,200 (10 ft. 6 in.).
Maximum width at 4,800 mm. (15 ft. 9 in.) above rail-level	1,560 (5 ft. 1½ in.).
Maximum height above rail-level ...	4,800 (15 ft. 9 in.).

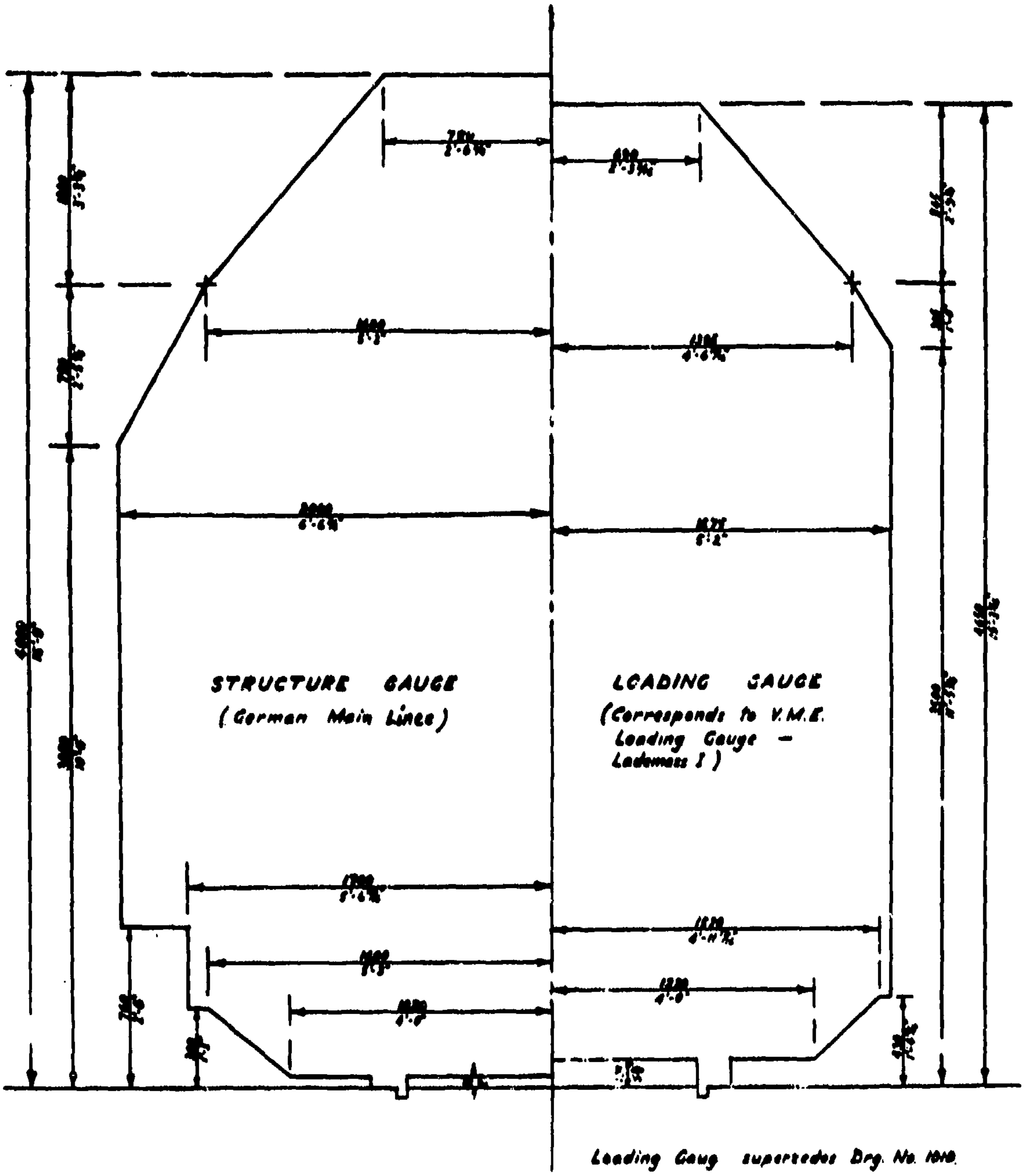
NOTE :—It should be noted that the general loading gauge on all standard gauge lines in all the Régions of the French National Railways is both wider and lower than the German general loading gauge.

I.S.T.D./C/317. Substitute for figure in text.

GERMAN STATE RAILWAYS

STRUCTURE & LOADING GAUGE.

Scale : 2 feet to 1 inch.

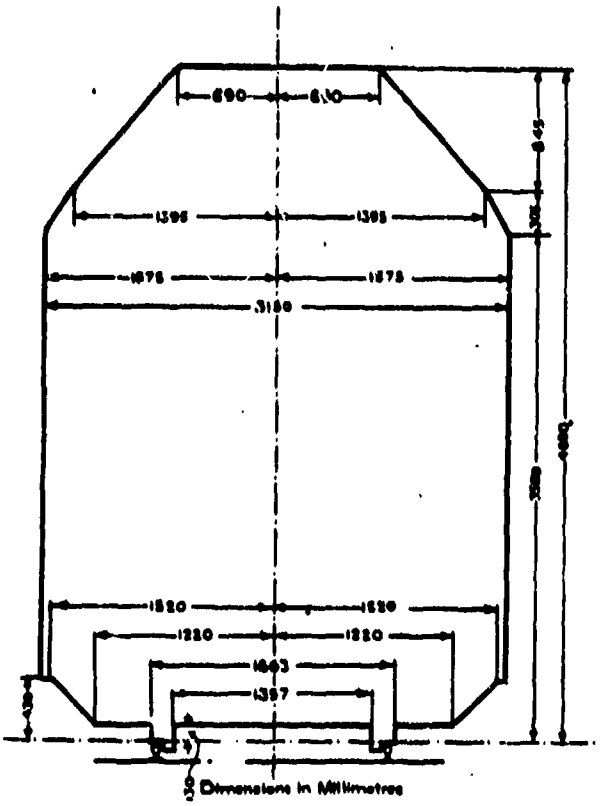


Loading Gaug supersedes Drg. No. 1010.

Th. I.c. War Office Jan. 1940.

Neg. No. 59/83

UNION OF CENTRAL EUROPEAN RAILWAY ADMINISTRATIONS



LOADING AND STRUCTURE GAUGE

Applicable to through traffic between Holland & Germany

(5) Permanent Way

There was formerly a great variety of permanent way construction in Germany, but latterly the Reichsbahn has used standardised weights, types, and dimensions of permanent way material, and this standard track is known as "*Einheitsoberbau*." The details given in the following paragraphs pertain to main-line track of this standard type, unless otherwise specified.

(a) Type, Length, and Weight of Rail

Rails of flat-bottomed (Vignole) Section are standard throughout Germany.

Dimensions of the standard Reichsbahn rail ("*Regelschiene*") are :—

Width of head	67/70 mm.
Height of rail	148 "
Width of web	14 "
Width of foot	125 "
Width of rail	49 kg. per metre (99 lb. per yard).
Section modulus	234 cm³.
Moment of inertia (neutral axis)	1,781 cm⁴
Tensile strength, at least 70 kg./mm².	(44·4 tons per sq. in.).

The standard length of these rails laid is 30 m. (98 ft. 5 in.), but Germany has also for several years past been using considerable numbers of longer 60 m. (196 ft. 10 in.) rails on main lines. Also long welded rails have been laid on bridges and in tunnels, thermit and electric resistance welding being used in this connection.

(b) Type of Rail Fastening

For the standard type track, rail fastenings are as follows :—

On timber sleepers—

Bearing plate fixed to sleeper by four coachscrews; rail fixed to bearing plate by two clips with bolts; wood packing between rail and bearing plate.

On steel sleepers—

Bearing plate welded to sleepers; rail fixed to bearing plate by two clips with bolts; wood packing between rail and bearing plate.

Rail joints are supported, contiguous timber sleepers (bolted horizontally) or a form of double steel sleeper, being used. Fishplates are of 4-hole type, 580 mm. long and weighing 9·2 kg.

(c) Type and Spacing of Sleepers

Timber sleepers are of both hard wood (oak or beech) and soft wood (pine or fir), and are creosoted by the Rüping process. Their dimensions are 2·6 m (8 ft. 6 in.) long by 260 mm. (10¼ in.) wide by 160 mm. (6¼ in.) high.

Steel sleepers (of which there is a large proportion in Germany) are of inverted trough type, and have the following dimensions :—

Length	2·5 m. (8 ft. 2½ in.).
Width at top	135 mm. (5⅜ in.).
Width at base	260 mm. (10¼ in.).
Height	100 mm. (4 in.).
Thickness	9 mm. (⅜ in.).

As mentioned in paragraph 5 (b) above, a form of double steel sleeper is used at rail joints, its dimensions being :—

Length	2·5 m. (8 ft. 2½ in.).
Width at top	135 mm. (5⅜ in.) and 135 mm. (5⅜ in.).
Width at base	440 mm. (1 ft. 5⅜ in.).
Height	100 mm. (4 in.).
Thickness	9 mm. (⅜ in.); 9·5 mm. between nearest edges of bearing surfaces.

Of all European countries, Germany has the greatest experience of steel sleepers. Although from the engineering standpoint the wooden sleeper is preferred, Germany has used a large proportion of steel sleepers in the interests of national economy and in support of the German steel industry. Wooden sleepers are, however, used as far as possible on trunk routes (as giving a more elastic track and being easier on the ballast), and also in industrial areas since, unlike steel sleepers, they are immune to the action of industrial gases.

The spacing of sleepers is 650 mm. between centres, giving 47 sleepers under each 30 m. rail length. As mentioned in paragraph 5 (b) above, bolted timber or double-steel sleepers are used at rail joints. The maximum number of sleepers per kilometre of track is 1,567.

(d) Nature of Ballast and Formation

Various kinds of ballast are used, but the general standard is good quality hard, broken stone or slag. The size of the ballast must be between 35 and 70 mm. diameter.

Standard main-line track section :—

Top width of ballast, single track lines	3·2 m. (10 ft. 6 in.).
Top width of ballast, double track lines	6·7 m. (22 ft. 0 in.).
Depth of ballast below bottom of sleepers	300 mm. (11¾ in.).
Side-slope of ballast	1 : 1·25.
Formation cambered for drainage.	
Bottom width of ballast, single track lines	4·56 m. (14 ft. 11 in.).
Bottom width of ballast, double track lines	8·10 m. (26 ft. 7 in.).

(e) Standard of Maintenance

Good.

The following table gives total figures of track and turnout renewals throughout the whole Reichsbahn system prior to the outbreak of war in 1939 :—

Year	Km. of track renewed each year	Turnouts, etc., renewed each year
1926	4,043	12,668
1927	4,136	12,336
1929	3,682	10,056
1933	2,646	6,387
1934	1,545	7,121
1935	1,336	4,581
1936	1,350	5,587
1937	1,438	5,514
1938	1,026	6,814

As the table indicates, the volume of renewals declined considerably in the thirties, but improved standards of construction were introduced, and single rails (not included in the above figures) were renewed on a larger scale than ever before; also it must be borne in mind that the relatively high renewal figures in the twenties resulted from the heavy renewal programme necessitated by the poor condition of the track at the end of the Great War.

Despite certain British reports to the contrary, the physical condition of the German permanent way at the outbreak of the present war in 1939 was excellent, and the standard of maintenance high.

(g) Maximum Permissible Axle-Loads

So far as railway locomotives and rolling stock are concerned, the maximum axle-loads permitted in their construction on the Reichsbahn is 20 tonnes (plus 5 per cent. tolerance).

With regard to the track itself, the usual maximum axle-load permitted on main line sections ("*Haupthahnen*") of the Reichsbahn is 20 tonnes, though there are some main line sections with lower permissible axle-loads (down to 16 tonnes); on secondary lines ("*Nebenbahnen*") of the Reichsbahn

the maximum permissible axle-load is usually 16-18 tonnes, though there are some secondary sections with considerably lower axle-loads.

(h) Curvature

The percentage of the whole Reichsbahn system on curves is given in the following table (1937) :—

Total route length of system, km.	... ...	54,522
Straight sections—		
Route length in km.	... ...	37,050
As percentage of total route length	...	68%
Curved sections—		
Route length in km.	... ...	17,470
As percentage of total route length	...	32%

The latter percentage is made up as follows :—

Curves with radius of 300 m. or above	...	21·3%
Curves with radius of less than 300 m.	...	10·7%

With regard to the minimum radius, curves of less than 180 m. radius are not allowed on main lines ; on secondary lines curves of 100 m. radius are permitted, unless traversed by main line stock. New main line vehicles must be built to take curves of 150 m. radius.

(i) Gradients

The percentage of the whole Reichsbahn system on various gradients, is given in the following table (1937) :—

Total route length of system, km.	... ...	54,522
Level sections—		
Route length in km.	... ...	15,430
As percentage of total route length	....	28·3%
Graded sections—		
Route length in km.	... ...	39,092
As percentage of total route length	...	71·7%
The latter percentage is made up as follows—		
Gradients up to 5 per mille	... ...	40·2%
Gradients of 5 to 10 per mille	... ...	19·3%
Gradients of 10 to 25 per mille	... ...	11·4%
Gradients over 25 per mille	... ...	0·6%

Gradients outside stations must not exceed 25 per mille (1 in 40) on main lines, and 40 per mille (1 in 25) on secondary lines. Gradients outside station limits greater than 12·5 per mille (1 in 80) on main lines are subject to special Ministry approval. In stations (sorting humps, etc., excepted), gradients must not exceed 2·5 per mille (1 in 400).

(6) Signalling and Safety Regulations

(a) General Methods

The working of lines on the German State Railway is conducted throughout on the space interval, or absolute block system, in the sense in which that term is used in Great Britain, assisted by the interlocking of points and signals ; the signalling equipment used is well constructed and maintained. The signal aspects are few, simple, and easily understood, and although some minor differences are to be found in this respect between various parts of the system, there is practically none in the fundamental principles on which they are based, and a very large measure of uniformity and standardising already obtained before the outbreak of the present war.

(b) Signal Types and Aspects

Main signals or "*Hauptsignale*" (*i.e.*, "Home" or "Starting" signals) are of the two-position upper-quadrant semaphore type, moving to 45 degrees in the upper right-hand quadrant (trains run right-handed) and showing a green light for "proceed," and moving to horizontal and showing a red light for "stop." Not more than three arms are allowed on one signal post at junctions or turnouts ; the additional one or two arms are normally in line with the post and practically invisible. Both the two and three-armed aspects, with respectively both or all these arms inclined to 45 degrees and showing green lights, indicate "proceed at reduced speed" over any route requiring such action. Advanced starting signals are practically unknown.

Advance signals or "*Vorsignale*" (*i.e.*, "distant signals) are of disc type, and are provided in connection with all main signals ; the disc revolves on a horizontal spindle to present its edge when "off." To mark the site of the signal when the disc disappears, a white board with two black V-marks, point to point, is placed by the base of the signal, and there are also three white warning approach boards in rear, the first the driver meets being 250 m. from the advance signal itself. The discs are coloured orange, and at night the signal shows two amber lights, placed diagonally, when "on," and two green lights when "off." A standard addition to the advance signal on main line sections is a pointed red and white semaphore arm, with central pivot, below the disc and normally in line with the post. When the main signal ahead shows "proceed at reduced speed," the disc remains displayed and the semaphore moves to the 45-degree position, a green light appearing below the upper amber light. Advance signals are installed at a distance of 1 km. from the main signals to which they apply.

Point indicators, consisting of lanterns with milk-glass slides, are installed at all points, except where there is no shunting ; a special combined type is used at double-slip crossings, to avoid a multiplicity of lanterns. There are no ground shunt signals, as used in Great Britain, and thus shunting prohibition signals (or closed-track indicators) are necessitated, to limit shunt moves as required, and protect running movements against them ; these closed-track indicators have a black bar (horizontal when "on," diagonal when "off") on a milk-glass background, and when "on," they order an absolute stop. When "off," however, they do not constitute an instruction to move, and are therefore often supplemented by "wait" and "draw forward" signs, consisting respectively of a large orange "W" board and the letter "V" in white lights.

(c) Signal and Point Operation, Interlocking, and Automatic Train Control

In the operation of signals and points, the standard mechanical apparatus is the double-wire system, although rod working is still used in places. All points are trailable and fitted with either the toggle or hook type locking ; for new standard long tongue turnouts at high-speed junctions, a modified form of hook lock, known as the claw lock, has been introduced. All facing points are properly detected. Mechanical locking bars are largely replaced by electric route locking, and track circuit point locking is also found. Signals are generally operated by cam-plate mechanism, ensuring good indications and smooth working.

There were 17,800 mechanical signal boxes on the whole Reichsbahn system in 1937. Frames are of the lever and drum type, except for some of the crank handle type at certain small stations. Point levers are generally free to be moved in any order with signals at "danger." Interlocking is by small "route handles" ("*Fahrstrassenhebel*"), which must be operated before the relative signal lever can be pulled, and there is thus practically no conditional locking. Block working inside station limits is controlled by an official called a "*Fahrdienstleiter*" who sanctions all movements ; the signal box in which he is stationed is known as a "controlling signal box" ("*Befehlstellwerk*"), and any others at the same station are subordinate to it.

Between stations, Siemens and Halske lock-and-block apparatus is used on double and single track line, except where traffic is light and the telegraph

system suffices. The block is worked by A.C. from magneto generators, or motor generators at busy places. There is, however, a certain amount of D.C. station block equipment. There are numerous intermediate blockposts, often controlling crossing barriers. The separation between section and station block working is a peculiar feature of German signalling and makes numerous signal replacers necessary. Treadle release for the block is often combined with an insulated rail to obtain a last-vehicle action, especially for route locking. Track circuiting is found at many stations, but the extensive use of steel sleepers (see paragraph 5 (*c*) above) has led to the development of axle counting apparatus, now installed at a number of places. On double lines block working is on the normally free system.

With regard to power signalling there were in 1937 on the whole Reichsbahn system 1,300 power signal boxes, of which 1,250 were electric, and the remainder electro-pneumatic. Latterly "multiple row" frames, with handles grouped in rows and thus saving much space, have been installed. Mechanical locking has so far been usually retained, the absence of conditionals making this comparatively simple. The signal mechanisms not only have a clutch, but are returned to normal by power. The block working is combined with the power frames in many ways; lamp indications have been increasingly used. The ordinary A.C. block apparatus in power boxes is sometimes worked from a distance by solenoid action. For hump marshalling yard working, which has been the object of much special research by the Reichsbahn, desk pattern frames are frequently used and many important yards have magazine point control and rail brakes of various types. Wireless is used in some cases for communication with the hump yard driver.

With regard to automatic train control, the Reichsbahn has developed this extensively, and several important routes are equipped with A.T.C. on the intermittent inductive system, with track magnets placed on the right-hand side of each track and with locomotive magnets fixed below locomotive cabs. Visual cab signals are not used, the working being based on the vigilance principle and direct observation of the fixed signals. The driver's action is not interfered with unless he fails to acknowledge an adverse advance ("distant") signal, when passing it, by depressing a vigilance button, or to reduce speed in accordance with the signal indications. The observation of permanent way and other speed restrictions is enforced and absolute stop signal action is provided, the control system thus constituting a most comprehensive one.

Secondary and light railways ("Nebenbahnen") are naturally worked with signalling equipment of a simpler order than that on main lines, and special simplified signalling regulations apply to these secondary sections.

(*d*) Telegraphs and Telephones

There is no block bell signalling as used in Great Britain, the lock and block being worked without it. Train description and other messages are sent on Morse inker instruments which are much used. Bell communication of a special form exists from station to station, and sometimes direct between major stations and to junctions. Large signal gongs ("*Lautwerke*") are installed at these main stations, with others on the same circuit at intermediate block posts, small stations, platelayers' huts, etc. Each down train departure is signalled by five blows, and each up train departure by five blows given twice. An emergency signal of 30 blows orders all who hear it to take instant measures to stop the traffic. There are telephone boxes at every kilometre along main lines, arrows on the telegraph posts showing the direction of the nearest. From these, at any hour, a responsible official at a bell signalling station can be spoken to; on learning of an accident, his first duty is to give the emergency signal.

The Reichsbahn telegraph and telephone systems are of a most complete character, with much equipment of the most modern type, including high-speed telegraphs, automatic telephones, carrier transmission, and some wireless services. There are also numerous electric clock and time signal installations, and subsidiary devices. Train despatching, or traffic control, has been successfully adopted on important sections of the Reichsbahn, including some in the area covered by this report.

(*e*) General Efficiency

In normal circumstances, the signalling and train control system of the German railways works efficiently and well, and ample safeguards are provided, as is evidenced by the Reichsbahn's satisfactory accident record.

(7) Electrification

In 1937 the whole Reichsbahn system included the following length of electrified line:—

	Km.	*Miles*
Route length—		
Single track line	599	373
Double track line	1,639	1,018
Multiple track line	25	16
Total Route Length	2,263	1,406

Two of the lines dealt with in this report are electrified, that from Stuttgart to München (Route 82) and that from Augsburg to Nürnberg (Routes 85 and 87). Current is supplied by overhead transmission on the standard system for German railways, namely, 15 KV A.C. 16⅔ cycles single phase, and is supplied from the general Bavarian industrial high tension system, which since 1930 has been tied in with the Austrian system. The current for these lines is supplied by the following power stations:—

(i) *Walchensee power plant*

Situated south of München, near Garmisch. Head 195m, with Walchensee Lake as storage basin; two single-phase sets, each of 10,650 Kva.

(ii) *Mittlere-Isar group of power plants.*

Situated north-east of München. Four single-phase sets of 12,000 Kva each, installed at the Eitting and Aufkirchen power plants. One transformer set of 18,000 Kva, installed at the Pfrombach power plant.

Voltages of power transmission from the power stations to the railway sub-stations are between 8 KV and 10 KV according to the network. The standard sub-station comprises static transformers at 5,000–6,000 Kva; the most important station at Pasing, near München, has five of these transformers. The average distance between sub-stations is 50–60 Km. The sub-stations for Route 82 are München Pasing, Meitingen (north of Augsburg), Neu Ulm and Stuttgart; those for Routes 85 and 87 are Meitingen, Gröbenzell and Nürnberg.

(8) Locomotives

(*a*) Numbers and Types

The locomotive stock of the whole Reichsbahn system at the end of 1937 (*i.e.*, before the incorporation of the Austrian Federal Railways into the Reichsbahn) was as shown in the following table:—

	Number
Steam locomotives with tenders—	
With 2 coupled axles	8
„ 3 „ „	4,513
„ 4 „ „	4,186
„ 5 „ „	3,518
„ 6 „ „	44
TOTAL	12,269
Tank locomotives—	
With 2 coupled axles...	184
„ 3 „ „	3,742
„ 4 „ „	2,316
„ 5 „ „	1,022
„ 6 „ „	11
„ 8 „ „	22
TOTAL	7,897
TOTAL, STEAM LOCOMOTIVES ...	20,166
Locomotives of special types	2
Electric locomotives—	
With 2 or 3 driving axles	97
„ 4 driving axles	361
„ 6 „ „	85
TOTAL	543
TOTAL, ALL LOCOMOTIVES	20,711*

	Number
Railcars—	
Steam	18
Electric	1,193
Oil and other types	808
TOTAL	2,019

* Of this number, only about 1 per cent. (less than 250) are narrow-gauge locomotives.

The steam locomotive stock of the Reichsbahn may be broadly classified under two heads—firstly, locomotives of former constituent systems of the Reichsbahn (Prussian State Railways, Bavarian State Railways, etc.), and secondly, locomotives of standard types ("*Einheitslokomotiven*") built since the formation of the Reichsbahn. The second class includes the special war-time locomotive types ("*Kriegslokomotiven*") designed to accelerate locomotive production and make the most economical use of available materials.

The following table shows the classification of the Reichsbahn steam locomotive stock under the above-mentioned heads, and also according to main types and series :—

Main Type	*Classification*	*Series*	*Remarks*
S	Express train locomotives with tenders ...	01	Einheitslokomotive.
		01[10]	„
		02	„
		02[1]	„
		03	„
		03[10]	„
		05	„
		06	„
		17[0]	Former Prussian S10[0] class.
	17	10–12	„ „ S10[1] class.
		18	„ Bavarian S3/6 class.
		18[0]	„ Saxon XVIII H class.
		18[1]	Former Wurtem C class.
		18[0]	„ Baden IV h[1–0] class.
		19[0]	„ Saxon XX H V class.
P	Passenger train locomotives with tenders...	24	Einheitslokomotive.
	37	0–1	Former Prussian P6 class.
	38	2–3	„ Saxon XII H2 class.
		38[1]	„ Bavarian P3/5 H class.
	38	10–40	„ Prussian P8 class.
	39	0–2	„ „ P10 class.
G	Goods train locomotives with tenders ...	41	Einheitslokomotive.
		43	„
		44	„
		45	„
		50	„
		52	Kriegslokomotive.
	55	25–56	Former Prussian G8[1] class.
	57	10–40	„ „ G10 class.
	58	2–3	„ Baden G12 class.
		58[4]	„ Saxon XIII H class.
		58[0]	„ Wurtem G12 class.
	58	10–22	„ Prussian G12 class.
S		59[0]	„ Wurtem K class.
St	Express train tank locomotives	61	Einheitslokomotive.
Pt	Passenger train tank locomotives	62	Einheitslokomotive.
		64	„
		71[0]	„
	74	4–13	Former Prussian T12 class.
		75[0]	„ Wurtem T5 class.
	75	5, 10–11	„ Baden VIc[6–0] class.
		75[0]	„ Saxon XIV HT class.
		77[1]	„ Bavarian Pt 3/6 class.
	78	0–10	„ Prussian T18 class.

Main Type	*Classification*	*Series*	*Remarks*
Gt	Goods train tank locomotives	80	Einheitslokomotive.
		81	"
		84	"
		85	"
		86	"
		87	"
		89	"
		93 5–20	Former Prussian T14[1] class.
		94[1]	" Wurtem Tn class.
		94 5–18	" Prussian T16[1] class.
		94 20–21	" Saxon XI HT class.
		95[0]	" Prussian T20 class.
		96[0]	" Bavarian Gt2x4/4 class.
Z	Rack locomotives	97[1]	Former Bavarian PtsL3/4 class.
		97[6]	" Wurtem E+1Z class.
L	Light railway locomotives	9[98]	Former Bavarian Pt. L3/4 class.
X	Narrow-gauge locomotives	99[85]	Einheitslokomotive (1m. gauge).
		99[80]	" (900 mm. gauge).
		99[75]	" (750 mm. gauge).

The series index numbers shown in the above table are followed by a set of three or four figures indicating the number of an individual locomotive in its particular series. Thus, an engine numbered 03 124 is an express train locomotive with tender, is of the 03 "Einheitslokomotive" series, and is locomotive number 124 of that series.

There is a further method used to classify the Reichsbahn steam locomotives for operating purposes, and known as the "*Betriebsgattung*." In this classification, the main type letter (as given in the above table) is used, followed by the number of coupled axles, the total number of axles, and the average axle-load in tonnes. Thus a locomotive of series 18 (a locomotive of the former Bavarian S 3/6 Class) has the "Betriebsgattung" rating S. 36.17, *i.e.*, it is an express train tender locomotive with three coupled axles, a total of six locomotive axles, and an average axle-load of 17 tonnes.

The table on page 13 shows the principal dimensions of certain of the main classes of steam locomotives of the Reichsbahn.

Diesel railcars have been widely used on the Reichsbahn for two different kinds of services, *i.e.*,

Firstly, for very fast long-distance services between the principal cities. The railcar sets used for these services are known as "*Schnelltriebwagen*," and are classified for operating purposes as "FDt" trains. These "Schnelltriebwagen" services, have, however, been withdrawn since the outbreak of the present war. The "FDt" train sets normally consisted of two cars, powered by two Maybach 410 h.p. diesel engines with electrical transmission.

Secondly, for semi-through services, local services and express light goods trains. The railcars used for these services are of numerous types, with engines of varying powers and differing transmission systems.

The Reichsbahn has endeavoured to standardise three general types of engines for railcars, the first of 600/650 h.p. the second of 275 h.p., and the third of 350/400 h.p. So far as transmission is concerned, mechanical drive has been widely and successfully employed for powers of 150 to 300 h.p.; for outputs over 300 h.p., electric transmission has given good performance, but with pressure-charged engines of 600/650 h.p., the weight ratio of electric transmission is unsatisfactory, and this has led to the use and development of lighter hydraulic transmission systems.

(b) Adequacy of Locomotive Stock

Before the present war, the locomotive stock of the German railways was adequate to deal with the traffic normally handled, and to cover additional traffic commitments at peak periods. After the outbreak of war, however, there developed a definite shortage of locomotives in Germany and German-occupied Europe generally, and this came about as the result of two major factors—firstly, the great increase in traffic, both in terms of tonnage handled and length of haul, which took place on the German railways as a result of the war (see paragraph 10 (*a*) below); and secondly, the necessity for dispersing a considerable proportion of the German locomotive stock over vast areas of occupied Russia, where practically the whole motive power park had to be provided from German sources.

It may in fact be stated that the German transport problem during this war, has until recently, been fundamentally one of a shortage of locomotives. To alleviate the effects of this shortage in the Reich itself, locomotives were drawn into Germany from other German-occupied countries, such as France and Belgium, wherever possible, thus causing serious operating problems and a strangulation of essential commercial traffic in those countries. At the same time Germany stimulated the production of new locomotives throughout occupied Europe, but actual output appears to be lagging considerably behind the production programme envisaged, and only recently have the German authorities begun to feel the benefit of the rationalization measures which they introduced in the locomotive industry earlier in the war. These measures included the concentration of production, firstly on a simplified version of the "series 50" 2-10-0 goods locomotive known as the "transition locomotive" ("*Übergangslokomotive*"), and latterly on the "series 52" 2-10-0 goods locomotive known as the "war locomotive" ("*Kriegslokomotive*"). As mentioned under para. 8 (*a*) above, the latter type was designed to make the most economical use of available materials and to accelerate output; it is claimed to effect a great saving in production man-hours.

Series (see preceding table)	Operating Classification (see above)	*Wheel arrangement (Suffix T indicates tank loco.)	Cylinders			Boiler Pressure	Driving wheels diameter	Weight of loco. only in running order		Capacity of Tender or Tanks		Length of loco. and tender over buffers
			No.	Diameter	Stroke			Total	Adhesive	Coal	Water	
				mm.	mm.	kg./cm.²	mm.	tonnes	tonnes	tonnes	m.³	mm.
01	S.36.20	4-6-2	2	600	660	16	2,000	111·1	59·7	10	34	23,940
02[2]	S.36.20	4-6-2	4	350 / 520	660	25	2,000	106	55	10	32	23,905
03	S.36.17	4-6-2	2	570	660	16	2,000	100·3	54·3	10	34	23,905
18	S.36.17	4-6-2	4	440 / 650	610 / 670	16	1,870	97	53	9	32	—
24	P.34.15	2-6-0	2	500	660	14	1,500	57·4	45·2	6	17	16,995
39[2]	P.46.19	2-8-2	3	520	660	14	1,730	100	75·7	7	31·5	—
43	G.56.20	2-10-0	2	720	660	14	1,400	110·8	96·6	10	32	22,620
44	G.56.20	2-10-0	3	600 / 550	660	16	1,400	110·1	95·2	10	30	22,620
50	G.56.15	2-10-0	2	600	660	16	1,400	86·5	75	8	26	22,940
52	G.56.15	2-10-0	2	600	660	16	1,350	85·7	76·5	10	32	22,975
57[2]	G.55.15	0-10-0	2	630	660	12	1,400	72	72	7	16·5	18,880
62	Pt.37.20	4-6-6T	2	600	660	14	1,750	123·6	60·8	4·3	14	17,140
64	Pt.35.15	2-6-2T	2	500	660	14	1,500	74·9	45·5	3	9	12,400
81	Gt.44.17	0-8-0T	2	500	550	14	1,100	67·5	67·5	3	8	11,080
85	Gt.57.20	2-10-2T	3	600	660	14	1,400	133·6	99·7	5	14	16,300
86	Gt.48.15	2-8-2T	2	570	660	14	1,400	88·5	60·6	4	9	13,820
87	Gt.55.17	0-10-0T	2	600	550	14	1,100	85·6	85·6	5	9	13,300
89	Gt.33.15	0-6-0T	2	420	550	14	1,100	45	45·8	2·6	4·8	9,600

* In Germany, wheel arrangements are indicated by the number of axles, the number of coupled axles being shown by a letter and the number of leading and trailing axles by figures. A 4-6-2 locomotive is thus a 2C1 in German notation, while a 2-8-0 is a 1D.

(c) Locomotive Running Depots and Workshops

The following is a list of locomotive depots on the routes covered by this report, listed under the R.B.D.s controlling them :—

R.B.D.	Place	Type of Shed	Capacity	Route
Augsburg	Augsburg	—	—	82, 83, 68
	Neu Ulm	—	—	82
Frankfurt (Main)	Aschaffenburg-West	...	—	86
	Frankfurt	1 rect. R.S. 2 Roundhouses 1 other Tbl.	90–100	52, 53, 54
	Frankfurt-Ost	—	—	52, 53, 54
	Hanau	—	—	86
	Limburg	—	25–30	52
Karlsruhe	Bruchsal	—	—	70, 67A
	Karlsruhe—			
	Passagierbhf	—	—	75, 66
	Rangierbhf			
	Kehl	—	—	75
	Mannheim	—	—	67, 65
	Passagierbhf	—	—	—
	Rangierbhf			
	Pforzheim	—	—	75
	Kaiserlautern	—	—	66, 65
Ludwigshafen	Landau	—	—	66
	Ludwigshafen	—	—	65
	Neustadt	—	—	71, 65
	Zweibrücken	—	—	66
Mainz	Bingerbrück	Roundhouse and Tbl.	20–25	54
	Hochheim (Mainz)	Roundhouse and Tbl.	30	54
	Darmstadt	A large depot employing 1,200 persons in 1937	—	67
	Mainz	Roundhouse and Tbl.	20–25	54
	Niederlahnstein	Rect. RS. and Tbl.	10–15	52, 53
	Oberlahnstein	Roundhouse and Tbl.	20–25	53
	Weinheim	—	—	67
	Wiesbaden	2 Roundhouses, 2 Tbls.	30–35	53, 54
München	Buchloe	—	—	—
	Ingolstadt	—	—	84, 87, 88
	München (1)	Possibly removed to M. Pasing	—	82
	„ (2)			
	„ Ost			
	Treuchtlingen	—	—	85, 86, 87
Saarbrücken	Dillingen	Roundhouse and Tbl.	15–20	56
	Ehrang	Roundhouse and Tbl.	20–25	51, 55
	Hermeskeil	—	40	57
	Homburg	Roundhouse and Tbl.	35–40	60, 62, 63
	Kochem	—	20	51
	Karthaus	Roundhouse and Tbl.	25–30	51
	Kirn	—	20	52
	Merzig	—	20	56
	Neunkirchen	1 Rect. RS.	—	—
		1 Roundhouse, Tbl.	45–50	59, 63
	Saarbrücken—			
	Passagierbhf	Rect. RS. and Tbl.	60–80 (probably reduced to 30–40 by bomb damage)	59, 60, 56, 63
	Rangierbhf			
	Simmern	—	20	—
	Trier (Hauptbhf)	Roundhouse and Tbl.	30	51, 56
	Volklingen	Radial tracks, partly covered, and Tbl.	20	56
Stuttgart	Aalen	—	—	79
	Crailsheim	—	—	74
	Geislingen	—	—	75
	Heilbronn (Hauptbhf)	—	—	74, 77
	Kornwestheim	—	—	75, 76
	Mühlacker	—	—	75
	Plochingen	—	—	82
	Stuttgart-Rosenstein	—	—	76
	Stuttgart-Untertürkheim	—	—	75, 76
	Ulm (Hauptbhf)	—	—	82
	Ulm (Rangierbhf)	—	—	83
Würzburg	Ansbach	—	—	74, 86
	Aschaffenburg (Hauptbhf)	—	—	86
	Gemünden	—	—	86
	Nördlingen	—	—	91, 89, 79
	Würzburg	—	—	86, 90
Köln	Koblenz (Moselbhf)	Roundhouse and Tbl.	Medium	51, 54, 53, 54
	Koblenz (Lützel)			

Generally, it may be said that at important operating centres in Germany, several separate engine sheds at different points are preferred to a single concentrated running depot. The roundhouse is the usual type of engine shed in Germany, and rectangular sheds are generally found at large centres only. Engine sheds are normally equipped with minor workshops capable of effecting ordinary running repairs.

So far as the main Reichsbahn workshops ("Ausbesserungswerke") are concerned, the following list gives details regarding the principal ones in the area covered by this report. The symbols used to indicate the types of vehicles with which they deal are as under:—

L = Workshops dealing with repairs to Locomotives.
P = " " " " " Passenger stock.
GW = " " " " " Goods wagons.
D = Diesel.
E = Electric.

Main Railway Workshops

R.B.D.	*Place*	*Type*	*Total Staff*	*Route*
Augsburg ...	Ingolstadt	L. P. GW. ...	1,462 (including personnel working at Augsburg)	82
Frankfurt ...	Nied	L.	1,429	52
Karlsruhe ...	Offenburg	L.	1,168	—
Mainz	Darmstadt	L. P. GW. ...	1,289 (including personnel working at Ludwigshafen)	67
München ...	München-Freiman	L. (D) and (E) GW.	2,292 (including personnel at main station)	82, 87
Nürnberg ...	Nürnberg	L. P. GW. ...	1,728 (including personnel in MY.)	74, 87, 90
Saarbrücken ...	Kaiserslautern	L. GW. ...	1,237	60, 63
	St. Wendel	L.	618	59
	Trier	L. P. GW. ...	1,292 (including personnel at Konz)	51, 55

The German locomotive and rolling stock industry, in addition to supplying the Reichsbahn and other German lines, had built up an extensive export trade, and German-built railway engines and vehicles are in operation in many parts of the world.

(d) Fuel and Lubricants

The coal consumption of the whole Reichsbahn system in a typical pre-war year (1936) was 14,463,000 tonnes, and of this amount 12,714,000 tonnes (88 per cent.) was used as locomotive fuel; this figure represents a consumption of 13·72 tonnes per 1,000 engine-kilometres. Locomotive coal consumption in the area covered by this report only may be estimated at about 2,300,000 tonnes per annum.

The great majority (approximately three-quarters) of the total German coal output comes from the Central Ruhr area ("Ruhr-Kohlen-Revier"), a small proportion also comes from the Aachen and Saar coalfields. The Ruhr coal ("Steinkohle") used for locomotive purposes is of relatively good quality, having a general calorific value of 6,400–7,400 per kilogram; it is, however, somewhat below the standard of the best British locomotive coals, which have calorific values of up to as much as 8,600 per kilogram. A typical composition of Ruhr coal would be as follows:—

	Per cent.
Volatile matter	25
Fixed Carbon	65
Ash	8
Moisture	2

Approximately 15 per cent. of the German railways' coal supply is normally in the form of briquettes made up from slack, etc., and having a calorific value of 6,400–7,200 per kilogram.

Ruhr and Aachen (and also Saar) coal is supplied to the Reichsbahn by the Rheinisch-Westfalisches Kohlen-Syndikat, with its headquarters at Essen. In addition to the pit coal produced in the area covered by this report, there is also a considerable production of lignite ("Braunkohle") on the west side of the Rhine in the Köln (Cologne) area ("Linkerheinisches Kölner Revier"); this district is, in fact, the second largest lignite producing area in the Reich.

For the inspection and receipt of coal supplies for the Reichsbahn from all the west German coal district referred to above, there is a special Reichsbahn "Kohlen-abnahmeamt" at Essen; this is responsible to the "Reichsbahn-Zentralamt" at Berlin (see paragraph 3 (a) above).

Various factors, such as the necessity of supplying Italy's coal requirements, have rendered Germany's coal position more difficult since the war, and the supply of coal for railway purposes in Germany has occasionally suffered in consequence.

With regard to the consumption of heavy oil for railcar operation, etc., this amounted to 38,000 tonnes for the whole of the Reichsbahn system in 1937; the approximate average calorific value of this oil was 9,700 per kilogram.

As regards lubricating oil, shortages have been frequently reported during the present war. In this connection, however, it is essential to distinguish between a general shortage of railway lubricants and local shortages or shortages of specific grades. Reports of shortages of lubricants and consequent operating troubles have been received every winter since the war began, but while there may have been temporary local shortages, possibly of certain grades only, there has as yet been no evidence of any widespread or serious lubricating difficulties on the Reichsbahn.

(e) Water Supply

Water supply for railway purposes is generally satisfactory throughout Germany. There were 1,881 railway watering installations on the whole Reichsbahn system in 1937; the number of stations with mechanically operated watering plant was 939, compared with the total number of 8,568 stations.

At important railway centres, marshalling yards, etc., large watertowers, frequently of brick or concrete construction, and with capacities of up to as much as 1,000 m³, are to be found.

Water cranes are of the usual Continental type, with rigid arms swinging horizontally.

Water troughs between the rails, as used in Great Britain, are not employed on the German railways.

Water softening is carried out as necessary by the addition of lime and soda, and in the case of particularly hard water, by the lime-barium sulphate method.

(9) Rolling Stock

(a) Numbers and Types

The carriage and wagon stock of the whole Reichsbahn system at the end of 1937 (*i.e.*, before the incorporation of the Austrian Federal Railways into the Reichsbahn) was as shown in the following table :—

	Number
Passenger Carriages—	
With 2 axles	18,809
„ 3 „	30,586
„ 4 „	14,896
„ 6 „	198
Total number of passenger carriages ...	64,489*
Total number of axles	190,148
No. of 1st class seats	15,931
„ „ 2nd „ „	394,747
„ „ 3rd „ „	3,238,813
Total number of seats	3,649,491
Average number of passenger carriages per km.	1·2
Luggage and Parcels Vans—	
With 2 axles	14,560
„ 3 „	3,042
„ 4 „	2,381
Total number of luggage and parcels vans	19,983*
Total number of axles	47,770
Average number of luggage vans per km. ...	0·4
Goods Wagons—	
Covered Wagons with 2 axles...	189,647
„ „ „ 3 „	541
„ „ „ 4 „	623
Total number of covered wagons	190,811
Total number of axles, covered wagons ...	383,409
Average load capacity per axle, covered wagons	7·5
Open wagons with 2 axles	334,140
„ „ „ 3 „	184
„ „ „ 4 „	11,970
Total number of open wagons	346,303
Total number of axles, open wagons ...	710,730
Average load capacity per axle, open wagons	8·7
Division of open wagons—	
High-sided	174,917
Low-sided and flat	71,386
Special Wagons—	
Total number of special wagons	37,885
Total number of axles, special wagons ...	78,623
Average load capacity per axle, special wagons	7·6
Total number of all goods wagons	574,999*
Total number of axles, all goods wagons ...	1,178,762
Average load capacity per axle, all goods wagons	8·2
Average number of goods wagons per km. ...	10·6
Number of privately-owned wagons	41,186
Number of axles, privately-owned wagons ...	84,861
Number of railway service wagons (1936 figure)	17,038
Number of axles, railway service wagons (1936 figure)	41,962

* Of these numbers, only about 1 per cent. are narrow-gauge vehicles.

With regard to Reichsbahn coaching stock, this is largely standardised in types and dimensions. The national symbol for German State Railway coaching vehicles is DR ; other symbols shown on Reichsbahn passenger stock conform to the international (R.I.C.) classification lettering, as follows :—

A	= 1st Class Passenger Carriage.
B	= 2nd „ „ „
C	= 3rd „ „ „
AB	= 1st and 2nd Class (composite) Passenger Carriage.
ABC	= 1st, 2nd and 3rd Class (composite) Passenger Carriage.
BC	= 2nd and 3rd Class (composite) Passenger Carriage.
Pw	= Luggage Van.
Post	= Mail Van.
Pw Post	= Composite Luggage and Mail Van.
Salon	= Saloon.
WL	= Sleeping Car, 1st and 2nd Class.
WLC	= Sleeping Car, 3rd Class.
WR	= Restaurant Car.

As a suffix to the above international symbols, Reichsbahn passenger stock with more than two axles shows the number of axles. The Reichsbahn also uses the following further symbols :—

ü	= Corridor Vehicle with vestibule connections.
i	= Vehicle with open type gangway.

A passenger carriage marked ABC4ü is thus a 1st, 2nd and 3rd Class composite corridor coach with four axles, and vestibule connections.

Passenger stock is generally of steel construction. All corridor coaches are fitted with end doors only. In the 1st and 2nd classes, upholstered seats are provided, the 3rd class has wooden seats only. Passenger stock is equipped with electric lighting and steam heating (the latter is frequently of the Pintsch low-pressure type). The following are the dimensions of a typical German standard passenger carriage (1st and 2nd Class composite express corridor coach) :—

Type of carriage	AB4ü.
Class of accommodation	1st and 2nd Class (composite).
Number of axles	4 (2 bogies).
Tare weight of carriage	39·1 tonnes.
Length over buffers	21·824 m.
Length of body	20·328 m.
Width of body over outer plates ...	2·928 m.
Height of body above rail level ...	3·933 m.
Distance between bogie centres ...	14·660 m.
Bogie Wheelbase	3·000 m.
Length of 1st and 2nd Class compartments*	2·300 m.
Length of vestibule	0·920 m.
Number of 1st class seats	8.
Number of 2nd class seats	30.

* N.B.—The standard lengths of 1st and 2nd class compartments of earlier stock are 2.15m. and 1.97m.

Another important type is the C4 carriage, which is a bogie vehicle with 80 3rd class seats and a tare weight of 44 tonnes.

In addition to Reichsbahn coaching stock, considerable numbers of sleeping and dining cars belonging to the Mitropa Company ("Mitteleuropäische Schlafwagen und Speisewagen Aktiengesellschaft" or Central European Sleeping and Dining Car Company) are normally operated over German lines. Before the present war, the Mitropa Company owned 344 sleeping cars and 321 dining cars.

Restaurant Cars were withdrawn generally on the Reichsbahn in June, 1942, as a result of war conditions, and were replaced by ordinary coaches.

With regard to Reichsbahn goods wagon stock, this is, like the coaching stock, largely standardised in types and dimensions. There are two main types, known as "*Einheitswagen*" (standard wagons) and "*Austauschbauwagen*" (wagons with interchangeable parts). The various classes of "Austauschbauwagen" are made up from parts which conform to the German Industry Standards (D.I.N.) and General Wagon Standards (W.A.N.); they were introduced as an addition to the "Einheitswagen" classes in order to facilitate the rationalisation of the German wagon-building industry.

"EINHEITSWAGEN" (Standard Wagons)—Dimensions

Class Symbol and Division (see above)	Type of Wagon	Inside Dimensions			Floor Area	Tare Weight		Load Weight	Capacity	Wheelbase		Door		Number of Axles
		Length	Width	Height		Without Hand Brake	With Hand Brake			Without Hand Brake	With Hand Brake	Width	Height	
		m.	m.	m.	m.²	t.	t.	t.	t.	m.	m.	m.	m.	
G. Kassel, München	Closed wagon	7·92	2·69	2·15* / 2·25†	21·3	10·5	11·0	15·0	17·5	4·5	4·5	1·5	2·0	2
Gl. Dresden	Closed wagon (long)	10·72	2·60	1·035* / 2·835†	28·8	12·5	13·0	15·0	17·5	7·0	7·0	2·0	1·935	2
K. Wuppertal	Wagon with lifting cover	5·295	2·812	1·25* / 1·685†	14·9	10·0	10·5	15·0	17·5	3·5 or 3·3	3·5 or 3·3	1·5	—	2
V. Hamburg	Covered wagon with open-board sides and 2 decks	6·95	2·684	2·06* / 2·21†	18·5	11·5	12·0	15·0	17·5	4·0	4·0	1·5	0·93	2
O. Halle	Open wagon with wooden sides	6·72	2·734	1·0	18·4	9·5	10·0	15·0	17·5	4·0	4·0	1·5	—	2
O. Nürnberg	Open wagon with metal sides	5·3	2·812	1·3 •	14·9	9·0	9·5	15·0	17·5	3·5 or 3·3	3·5 or 3·3	1·5	—	2
Om. Essen, Bremen	Open wagon (long)	7·72	2·756	1·55	21·3	10·5	11·0	20·0	22·0	4·5	4·5	1·5	—	2
R. Stuttgart	Flat wagon with removable side staves	10·12	2·67	—	27·0	9·5	10·0	15·0	17·5	6·5	6·0	—	—	2
S. Augsburg	Flat wagon with side stanchions	13·0	2·75	—	35·7	10·5	—	15·0	17·5	—	8·0	—	—	2
SS. Köln	Flat wagon (long) with side stanchions	15·06	2·75	—	41·4	—	20·0	35·0	36·75	10·0	—	—	—	4
H. Regensburg	Ballast wagon or lorries (deck	8·0	2·05	—	20·0	9·5	10·0	15·0	17·5	4·5	4·5	—	—	2

* To top of side, centre height of roof.

"AUSTAUSCHBAUWAGEN" (Wagons with interchangeable Parts)—Dimensions

Class Symbol and Division (see above)	Type of Wagon	Inside Dimensions			Floor Area	Tare Weight		Load Weight	Capacity	Wheelbase		Door		Number of Axles
		Length	Width	Height		Without Hand Brake	With Hand Brake			Without Hand Brake	With Hand Brake	Width	Height	
		m.	m.	m.	m.²	t.	t.	t.	t.	m.	m.	m.	m.	
G. Kassel	Closed wagon	7·72	2·74	2·12* / 2·845†	21·2	11·5	11·0	15·0	17·5	4·5	4·5	1·5	2·0	2
GL. Dresden	Closed wagon (long)	10·72	2·74	2·12* / 2·845†	29·4	13·5	14·0	15·0	17·5	7·0	7·0	2·0	2·0	2
K. Wuppertal	Wagon with lifting cover	9·70	2·80	2·25* / 1·985†	19·0	11·0	11·5	15·0	17·5	4·0	4·0	1·5	—	2
V. Hamburg	Covered wagon with open board sides and 2 decks	7·75	2·75	2·08* / 2·80†	21·3	12·5	13·0	15·0	17·5	4·5	4·5	1·5	0·93	2
O. Halle	Open wagon with wooden sides	6·72	2·74	1·0	18·4	9·5	10·0	15·0	17·5	4·0	4·0	1·5	—	2
Om. Königsberg	Open wagon (long)	7·72	2·756	1·55	21·3	10·5	11·0	20·0	21·0	4·5	4·5	1·5	—	2
R. Stuttgart	Flat wagon with removable side staves	10·72	2·72	—	29·2	10·5	11·0	15·0	17·5	7·0	7·0	—	—	2
Sm. Augsburg	Flat wagon with side stanchions	12·018	2·80	—	34·4	11·5	—	20·0	21·0	—	8·0	—	—	2
SSl. Kassa	Flat wagon (long) with side stanchions	18·00	2·75	—	49·7	—	23·0	40·0	40·5	12·8	—	—	—	4
H. Regensburg	Brake-van wagon or horse truck	8·15	2·50	—	20·4	—	10·5	15·0	17·5	4·5	4·5	—	—	2

* To top of side. † To centre height of roof.

All German wagons bear symbol letters indicating their general type; these symbol letters are shown in the tables on pp. 17,18. The symbol letter is followed by the name of one of the R.B.D.'s; the latter does *not* indicate the Railway Division to which the wagon belongs, but is a further indiction of the wagon-type and may differ according to whether the wagon is an "Einheitswagen" or an "Austauschbauwagen." Thus, a wagon marked Om Essen is a 20-ton open "Einheitswagen," whereas one marked Om Königsberg, while also a 20-ton open wagon, is of "Austauschbauwagen" construction.

The table on pages 17 and 18 show the principal dimensions of the "Einheitswagen" and "Austauschbauwagen" wagon classes.

The tables represent the principal types of wagons on the Reichsbahn, but there are, of course, many other types in use for special traffics, etc. Thus, as an example, an SSt wagon is equipped to carry heavy loads or is a well wagon; the "SS" classification indicates that it is a long wagon of open type without sides, while the suffix "t" shows it to be a "Tiefladewagen" (*i.e.*, for heavy loads).

Types of bogie war flat wagons introduced on the German railways for military loads (tanks, guns, road vehicles, etc.) have the following dimensions:—

Class Symbol	SSy.	SSys.	SSyms.
Class Division	Köln.	Köln.	Köln.
Number of Wheels per bogie	4	4	6.
Distance between axles of bogie	1·8	1·8	1·5 + 1·5 m.
Distance between centres of bogies	6·15	6·15	9·2 m.
Floor Length	8·8	8·8	11·2 m.
Floor, extended, end boards down	9·5	9·5	11·9 m.
Floor width	3·15	3·15	3·15 m.
Tare weight	15·3	16	22 tonnes.
Load weight	46	46	80 tonnes.
Capacity	48	48	83 tonnes.

The Reichsbahn pre-1939 wagon stock is reported to have included about 13,000 "convertible" wagons for use in connection with international traffic to and from the broad-gauge U.S.S.R. railways. Altogether, there were some 80,000 wagons of this kind, with interchangeable axles, in use in Eastern Europe before the present r. The German wagons of this type had the suffix "r" after their Class symbol; thus Gr. and Rr. wagons are respectively closed and flat (side-stave) types with interchangeable axles for both the 1·435 m. and 1·524 m. gauges.

The Reichsbahn wagon stock also included a number of wagons conforming to both the German and British loading gauges, for use in connection with the Harwich ferry service to England. The German wagons of this type had the suffix "f" after their class symbol; thus Gfh and Rfh wagons are respectively closed and flat (side stave) types conforming to the British as well as the German loading gauge.

* As in the case of locomotives, and for the same reasons (*vide* paragraph (8 (*b*)) above), the present war caused a shortage of wagon stock in Germany. This shortage was not as acute as that of locomotives, but the Reichsbahn had to take active measures to deal with it. These measures included the more rapid loading and unloading of wagons by traders (to ensure a better average wagon turnround and increased utilisation of the available stock), and the overloading of wagons by up to two tonnes in excess of their normal permissible load; the latter measure was withdrawn during 1943, as a result of either an easing of the wagon situation or a marked deterioration in the general condition of wagons, but was partially reimposed later in the year.

(*b*) Braking Equipment

Compressed air brakes manufactured by the Knorr Bremse A.G. of Berlin are the standard on the German railways. The main types are the Kunze-Knorr, and Hildebrand-Knorr brakes, and there are three principal classifications for all continuous brakes, viz:—

Specially powerful and quick-acting continuous brakes.

Quick-acting continuous brakes.

Slow-acting continuous brakes.

The Knorr type brakes have been found reliable in use, and as they are of solid construction, they are not subject to damage. A prominent feature is their graduated application and graduated release. Stock fitted with Knorr brakes can be worked with Westinghouse-fitted stock, and vice-versa, so that German wagons can be operated elsewhere in Europe, while rolling stock from other European countries can run over the Reichsbahn.

All passenger stock and the majority of the goods stock is fitted with the continuous brake; other goods vehicles are piped. All new vehicles are produced complete with the compressed-air brake fittings. In view of the considerable numbers of foreign wagons not fitted with either brakes or pipes in circulation on the German railways, the Reichsbahn has evolved a form of temporary detachable air brake pipe which can be attached to such wagons to enable them to run in fully fitted trains. In accordance with international agreement, German wagons show a single horizontal white corner band when piped only, and two or three bands when fully fitted with continuous brakes.

In addition to the air brakes, some wagons are fitted with handbrakes of the spindle type, operated from an end platform; the brake handle is then usually enclosed in a small caboose.

(*c*) Buffing and Draw Gear

Standard-gauge Reichsbahn stock is normally fitted with spring-loaded side buffers; the buffer springs are of the volute and ring types.

With regard to couplings, these are normally of a screw and link type; with the exception of special vehicles, Reichsbahn passenger and goods stock has continuous drawbars.

Scharfenberg automatic centre-buffer couplers have been fitted in some cases on railcars and other such special types of vehicle.

(*d*) Rolling Stock Workshops

A full list of the main Reichsbahn repair shops ("*Aw ausbesserungswerke*") including those dealing with carriage and wagon repairs, in the area is given in paragraph 8 (*c*) above.

(10) Traffic

(a) Nature and Density

Traffic statistics for the whole Reichsbahn system for 1937 (*i.e.*, before the incorporation of the Austrian Federal Railways into the Reichsbahn) were as follows :—

	Number
Passenger Traffic—	
Number of 1st class passengers carried	193,575
" " 2nd " " "	94,320,579
" " 3rd " " "	1,713,427,279
Total number of passengers, all classes	1,808,041,433
Number of passenger-km. 1st class (thousands)	100,052
Number of passenger-km. 2nd class (thousands)	3,110,943
Number of passenger-km. 3rd class (thousands)	46,884,600
Total number of passenger-km. all classes (thousands)	50,095,595
Average length of passenger journey (km.)	27·7
Luggage and Parcels Traffic—	
Number of tonnes carried	429,800
Number of tonnes-km. (thousands)	50,896
Goods Traffic—	
Number of tonnes of express goods carried	2,493,773
Number of tonnes of slow goods carried	446,341,854
Number of tonnes of service traffic carried	50,411,625
Total number of tonnes of goods, all classes	499,047,252
Number of tonne-km., express goods (thousands)	332,060
Number of tonne-km., slow goods (thousands)	71,870,098
Number of tonne-km., Service Traffic (thousands)	7,554,369
Total number of tonne-km., all classes (thousands)	79,757,030
Average length of haul per tonne (km.)	159·8

Before the war the R.B.D.s in which lies the area covered by this report, accounted for about 25 per cent. of train Km. run and about 21 per cent. of tonnage carried, by the whole Reichsbahn system. It must, however, be noted that the lines described form only part of the R.B.D.s concerned.

As regards the dependence of the life of the community on railway transport, Germany's railways may be considered by all criteria to constitute the greatest single factor in maintaining the economic life of the nation; in war time, they also have to shoulder a heavy share of the burden imposed by the national war effort. As one of the primary land powers on the Continent, and as a powerful industrial and commercial nation, Germany has naturally fostered the development of her means of internal communication to the maximum, and of these she has paid the greatest attention to her railways, as being the most suitable for heavy movements over long distances at relatively high speeds.

(b) Weights and Speeds of Trains

Average gross train weights for the whole Reichsbahn system in 1936 were as follows :—

	Average No. of axles per train	*Average gross weight of train (tonnes)*
Passenger Trains ...	22·5	208
Goods Trains	78·6	701

In relation to the above average gross weight, the average *net* goods train load in the same year was 307 tonnes.

It must be borne in mind that the above figures cover light local services as well as main-line ones. The average *main-line* goods bulk loads of coal, etc., may reach as much as 1,200 tons net (*i.e.*, 1,800-2,000 tons gross).

As regards train speeds, passenger trains are classified by index letters which give an indication of their speeds, viz. :—

FDt = "Fernschnelltriebwagen." These were very fast main-line diesel railcar service, with maximum speeds of up to 160 km /h. (100 m.p.h.), and overall speeds of over 100 km./h. (62 m.p.h.). On one of these services, the overall speed was in 1937 as much as 128·7 km./h. (79·5 m.p.h.). As mentioned under paragraph 8 (a) above, these "FDt" services have been withdrawn since the outbreak of war.

FD = "Fernschnellzug." This is the fastest class of steam trains (corridor stock) with overall speeds normally between 80 and 100 km /h. (50–62 m.p.h.). Prior to the war, however, one of these services had an overall speed of as much as 119·6 km./h. (74·3 m.p.h.).

D = "Schnellzug." These are ordinary steam express train services (corridor stock) with overall speeds normally between 70 and 90 km./h. (44–56 m.p.h.), though one pre-war "D" service had an average throughout speed of as much as 111·0 km./h. (69·0 m.p.h.).

E = "Eilzug." These are fairly fast services (non-corridor stock) with average speeds normally up to about 70 km./h. (44 m.p.h.), though one pre-war "E" service had an average throughout speed of 90 km./h. (55·9 m.p.h.).

P = "Personenzug." This is the lowest class of passenger train, similar to the French "train omnibus," consisting of 5- or 6-wheel non-corridor stock, and having average speeds of about 40 km./h. (25 m.p.h.).

(N.B.—In addition to the index letters given above, each passenger train is numbered. In many cases, trains in connection bear the same number, but with a different hundreds figure, *e.g.*, trains D.122, D.222 and D.322 connect with train D.22. The index letter is not used in the case of "Personenzüge.")

The throughout speed of main-line goods trains is normally about 20–25 m.p.h., in peace time, the normal permissible goods train speed was 70 Km/h (43·5 m.p.h.), and 75 Km/h (46·6 m.p.h.) in the case of trains formed of appropriate rolling stock.

(c) Traffic Control

Reference to this has already been made in paragraph 6 above. A system of train despatching and traffic control has been successfully used on main line sections of the Reichsbahn.

(d) Special Features and Difficulties of Operation

Right-hand running is the rule on double-track sections of the Reichsbahn.

Difficulties of operation have been caused in parts of the area by heavy British air bombing during the present war; the density and complexity of the railway layout has, however, implied a wealth of alternative routes. The method recently adopted by the Reichsbahn after devastating night bombing attacks on any particular industrial and communications centre in the Ruhr, has been to impose an embargo on ordinary commercial traffic to that centre until a sufficient measure of repair and reorganisation has taken place there to enable such traffic to be satisfactorily handled.

(e) Marshalling Yards and Terminal Facilities

The Reichsbahn operating organisation is unique in that goods train services in peace time are based on marshalling yard working, in contrast to the British, American and French systems, where the services are based on the hour of departure from the originating city and the required hour of arrival at the destination city.

The following is a list of the principal Marshalling Yards in the area, together with their daily capacities :—

R.B.D.	Name	Capacity (wagons per 24 hours)	Route
Augsburg	Augsburg	2,900	82
Frankfurt	Main	2,700	52, 53, 54
Karlsruhe	Karlsruhe	3,300	66, 75
	Mannheim	7,000	65, 67
	Offenburg	3,200	—
Köln	Koblenz	2,600	51, 52, 53, 43
Mainz	Bingerbrück	2,000	54
	Bischofsheim	3,200	54
	Ludwigshafen	2,200	65
	Oberlahnstein	2,000	53
München	Laim	2,000	54
	Ost	2,000	82
Nürnberg	Aschaffenburg	3,000	86
	Nürnberg	2,900	74, 87, 00
	Würzburg	2,000	86, 90
Saarbrücken	Zweibrücken	—	66
	Homburg	—	60
	Enkang	4,000	51, 55
	Saarbrücken	—	59, 60
	Kaiserlautern (Rinsiedlerhof)	3,500	60
Stuttgart	Heilbronn	2,000	74
	Kornwestheim	4,000	75
	Untertürkheim	2,200	82
	Ulm	2,400	82

In the view of the particularly important part played by marshalling yards in the operation of the Reichsbahn, Germany has been one of the leading countries in marshalling yard design, operation, and technique. Marshalling yards in Germany are mostly of the mechanised hump type, with wagon retarders (normally hydraulic rail brakes of the Frölich or Thyssen pattern), with "cut card" working.

With regard to the terminal facilities, these are normally adequate, though at many centres their efficiency has now been considerably reduced by damage resulting from British air bombing.

(11) Capacity

Railway capacity is generally high, owing to the large proportion of double and multiple-track line, and to the shortness of block sections. Certain double-track sections may be able to sustain a maximum frequency of as much as 144 trains per day each way (*i.e.*, one train each way every 10 minutes). In view, however, of the fact that in many cases the terminal facilities at individual centres would be insufficient to deal with this number of trains, and also in the absence of special organisation, the practical capacity of double-track main lines is not likely to exceed 60–72 trains per day each way for all purposes (*i.e.*, one train each way every 20–24 minutes).

Single track lines may be taken as having a capacity of between 16 and 24 trains per day each way, according to the traffic frequency which they were laid out to handle.

Particulars of train weights and speeds have already been given in paragraph 10 (*b*) above.

(12) Vulnerability of System

The density of the railway network generally implies a wealth of alternative routes in the event of the cutting of main lines, and this has been evidenced by the ability of the Reichsbahn to maintain the great majority of the rail traffic in the face of repeated and devastating British air bombing attacks.

The two electrified lines from Stuttgart and Augsburg receive their supply of current from power houses in the neighbourhood of München; any advance in this direction from the west must, therefore, assume that electric traction will be impracticable

(*a*) Bridges

The following is a list of the larger and more vital railway bridges in the area covered by this report :—

(a) Bridges

The following is a list of the larger and more vital railway bridges in the area covered by this report:—

Bridges and Viaducts of Metal Construction

Route Number	Km.	At	On Section	Over	Total Length	Number and Length of Spans	Height	Date Built	Number of Tracks	Type of Construction
					m.		m.			
63	61·4	Ludwigshafen	Ludwigshafen-Mannheim	R. Rhine	400	3×91m	—	1932	2	Through steel braced girder spans on stone or concrete piers; also stone or concrete arch side spans.
70	1·8	[illegible]	[illegible]-Landau	R. Rhine	318	3×90m 1×16·9m	—	1875/78	2	3 haghached braced girder spans on masonry piers; short approach spans.
54	90·2	Mainz	Mosbach-Biebrich	R. Rhine	915	2×93·8m 1×107·2m 2×116·8m 6×39·2m	14·5	1904	2	5 main steel arch spans on stone piers; 6 central steel girder deck flood spans. Availed to for vehicles. Prepared for demolition.
54	94·8	Mainz	Mainz-Biebrich	R. Rhine (above Mainz)	1029	4×104·96m 6×35m 4×26m 20×13·8m	12·7	1910/12 (Piers 1860/62 and 1870/72)	2	4 main bow and chain steel braced girder spans on stone piers; 30 lattice and plate girder steel deck approach spans. See sketch Appendix No. 20, Fig. 1.
52	157·2	Göls	Koblenz-Trier	R. Mosel	262	3×64m 2×17m	—	1926	2	3 main steel arch spans, beneath track, on stone piers; also 2 stone arch side spans.
82	182·7	Hochzoll	München (Munich)-Augsburg	R. Lech	125	1×91m 2×8·2m	—	1915/26	2	Main steel arch span on concrete piers; 2 small concrete side spans.
67	131·9	Frankfurt-am-Main	Frankfurt-am-Main-Darmstadt	R. Main	283·3	5×52·8m	—	1927	4	Parallel braced steel through girder spans on stone piers.
51	52·5	Ehrer	Koblenz-Trier	R. Mosel	277·6	1×88m 1×41·6m 4×36·99m	—	1927	2	See Appendix 20.
66	158·3	Mara	Wörth-Karlsruhe	R. Rhine	360	2×180m	—	1938	2	Main braced steel through girder spans, on stone piers. Total weight of metal (railway section of bridge), 3,986 tons.
56	1·6	Deutschherren-Brücke	Frankfurt-am-Main (Süd)-Frankfurt-am-Main (Ost)-Aschaffenburg	R. Main	600	2×74·6m 1×124·8m also 16 approach spans	—	1912	—	3 main steel arch spans beneath tracks; also 16 approach spans.

Bridges and Viaducts of Metal Construction—*Continued*

Route Number	Km.	At	On Section	Over	Total Length	Number and Length of Spans	Height	Date Built	Number of Tracks	Type of Con-truction
					m.		m.			
52 53	2·3 2·3	Koblenz	Koblenz–Niel (abzweig) ...	R. Rhine	584	2 × 107m 4 × 59m	18·5	1876/79 (Strengthened 1902)	2	2 main steel arch spans, beneath track on stone piers; also 4 stone arch approach spans. Prepared for demolition. See Appendix No. 20, Fig. 2.
75	—	Kehl	Appenweier–Strasbourg (Fr.)	R. Rhine	272	Before damage in 1939/40 1 × 26m 3 × 56m 1 swing span 2 × 60m. Since repair 1 × 26m 2 × 56m 1 × 26m 1 × 56m	45	Damaged 1939/40, since repaired	2	Before damage in 1939/40 consisted of 3 main through steel lattice girder spans on stone piers, with one fixed and 1 swing plate girder side spans. In rebuilding, 2 of the main spans and the fixed side spans were retained; a new main braced girder through span and a smaller fixed deck span replaced the previous lattice girder and swing spans in reversed position. See Appendix No. 20, Fig. 3.
68	—	Wintersdorf	Karlsruhe–Strasbourg (Fr.)	R. Rhine	570	3 × 92m 9 × 32·0	9·1	—	2	3 main highbunched braced steel girder through spans; 9 braced steel girder deck approach spans; all on stone piers.
75	141·7	Bietigheim	Mühlacker–Bietigheim ...	Enztal	286	21 × 13·2m	36	1853	—	Stone arches.
82	3·2	Cannstatt	Stuttgart–Ulm	R. Neckar ...	323	1 × 16m 2 × 45m 1 × 56m 2 × 17m 1 × 20m	23	1911	—	Concrete three pinned arches.
92	94·1	Ulm	Stuttgart–Augsburg ...	R. Donau (Danube)	150*	5 main spans × 20m*, also 2 side spans	15*	—	—	Stone or brick arches.
51	58·7	Zuzint	Ehrang–Koblenz	Valley	570	24 × 19·0m	—	1917 22	—	Concrete arches.
70	10·4	Stuttgart	Korbwestbahn–Untertürkheim	Neckar	675	10 × 50·4m 1 × 67·4m	30	1898–1904	2	Braced steel girder deck spans on stone piers.

* = Estimated.

(b) Workshops and Depots

The locations and details of railway workshops and depots in the area covered by this report are given in paragraph 8 (c) above, and layouts of certain of them are shown in the Appendices. Locomotive repair shops, running sheds, and installations generally should constitute suitable points for attack, and many have already been severely damaged in Allied air raids.

(c) Electric Railway Power Stations and Installations

The most important single point is the transformer station at München, which supplies most of the current to the electrified lines in the area.

(d) Traffic Centres and Marshalling Yards

The importance of marshalling yards in German goods traffic operation has already been emphasized, and a list of all the major marshalling yards in the area, together with their daily wagon capacities, is given in paragraph 10 (e) above.

(12) New Works and Recent Developments

(a) Lines under Construction

There is no evidence of the construction of any new lines in the area covered by this report, apart from additional industrial spurs and branches, etc.

(b) Other Constructional Works in Hand

A considerable amount of constructional activity has been necessitated in the repair of railways damaged by the heavy British air attacks.

(c) Lines Projected

There are no known projects of any importance for the construction of new lines in the area.

(d) Lines Dismantled or not in Use

There are no known lines of any importance in the area which have been dismantled or permanently abandoned.

(14) Itineraries

The following abbreviations are used in the detailed descriptions of lines :—

Cr ( )	= Crane (safe load in metric tons, in brackets).
DE	= Dead-end.
DES	= Dead-end siding.
DT	= Double-track.
ER ( )	= End-loading ramp (length in metres, if known, in brackets).
ES	= Engine shed.
I	= Interchange with line of different gauge.
J	= Junction.
LS	= Loop-siding.
MY	= Marshalling yard.
PL	= Passing loop.
RpS	= Locomotive and/or wagon repair shops.
SER ( )	= Side and end-loading ramp (length in metres if known, in brackets).
s.e.	= Steam-operated.
SR ( )	= Side-loading ramp (length in metres, if known, in brackets).
SSt	= Electric sub-station.
ST	= Single track.
SY	= Shunting yard.
Tbl ( )	= Turntable (diameter in metres in brackets).
W ( )	= Watering facilities (storage capacity in cubic metres, in brackets).
Wb ( )	= Weighbridge (capacity in metric tons, in brackets).

Other operating facilities are written in full.

A complete list of the routes described will be found in the Contents, and they are also shown on the diagram at the beginning of the report.

ROUTE 51

APACH (MOSELLE)—PERL—TRIER (SOUTH)—EHRANG—KOCHEM—KOBLENZ

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 161·1 km. (100 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 tonnes.
5. *Gradients :* No details available, but as line runs along bank of Moselle for most of the way, it is not expected that severe gradients will be encountered.
6. *Curvature :* No details are available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 7·5 km. (SALMROHR—WENGEROHR.)
9. *Marshalling Yards (MY) :* EHRANG.
   KOBLENZ (MOSELLE).
   " (LUTZEL).
10. *Engine Sheds (ES) :* KARTHOUS.
    TRIER.
    EHRANG.
    KOCHEM.
    KOBLENZ.
12. *Watering facilities :* No details available.
13. *Vulnerable points :*
    (*a*) Marshalling Yards and Engine Sheds referred to in paras. 9 and 10.
    (*b*) Main junctions at TRIER, EHRANG and KOBLENZ.
    (*c*) Tunnels at kms. 27·0, 59·2, 90·0, 100·5, 106·6, and particularly the KAISER-WILHELM tunnel at 108·5 km.—for details, see description of line.
    (*d*) Bridges at kms. 40·2 (over SAAR), 52·5, 101·2, 107·2, 157·2 (over MOSELLE).
14. *Capacity :* 72 trains per day each way, of 400/450 tons net train load each.

Distance from APACH.

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	APACH (MOSELLE)	—	Continuation of lines from Paris via (1) Mézières—Charleville; (2) Châlons and Thionville; (3) Châlons, Bar-Le-Duc and Metz.
0	0	APACH (MOSELLE)	—	SER. Wb. Cr. (Distance from Thionville 21km.)
½	1·2		—	Frontier. Line runs along right bank of Moselle.
1	1·6	PERL	—	Frontier station. Cr (5 t). Wb (90 t.). SER.
3	4·9	BI[illegible]H	—	Passenger station only.
3½	5·6	NENNIG	—	SER. Wb (40 t.). Cr (3 t.).
5½	9·3	PALEMM	—	Passenger station only.
10½	16·5	WEMP	Bridge over tributary of Moselle	Passenger station only.
12½	20·0		Road over bridge	
			Bridge over tributary of Moselle	
12½	20·3	WINCHERINGEN	—	SER. Cr (2 t.).
13½	21·7		Bridge over tributary of Moselle	
16½	26·4	NITTEL	—	Cr (3 t.). Restricted goods facilities.
16½	27·0		Tunnel	c. 600 m. long.
18	28·9	WELLEN	—	SER. Wb (30 t.). Cr (3 t.).
18½	29·6		Road overbridge	
18½	30·2		Bridge over tributary of Moselle	

Distance from APACH

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
19½	31·2	TEMMELS	—	Passenger station only.
			3 road overbridges	
19½	31·7		Bridge over tributary of Moselle	
22½	35·8	OBERMILLIG	—	Passenger traffic only.
23	37·1		Bridge over tributary of Moselle	
23½	37·6	WASSERLIESCH		Passenger traffic only.
24½	39·6		Flyover	Line passes under u/m loop.
24½	39·9		—	J (trailing) from right with loop connection over Moselle to line from Wasserbillig–Ehrang (Route 55)—length of loop *c.* 1 km.—Bridge over Moselle *c.* 200 m. long.
25	40·2		Bridge over Saar	*c.* 200 m. long.
25	40·5		—	J (triangular) with connection over Moselle to Wasserbillig–Ehrang line (Route 55). Bridge over Moselle *c.* 350 m. long, 3 spans.
25½	41·3			
			Road overbridge	—
25½	40·9		Flyover	Line passes under connection from DT s.o. line Saarbrücken Konz (Route 56).
			—	Line runs parallel with line from Saarbrücken. (Route 56.)
26½	42·7	KARTHAUS	—	SER. ES (25/30) roundhouse. Tbl.
				J (trailing) with DT s.o. line from Saarbrücken. (Route 56.)
27½	43·7		Bridge over main arterial road	
28½	45·7		Road overbridge	—
29½	47·8	TRIER (SOUTH)	—	Passenger traffic only. 2 platforms (island).
			4 road overbridges	
30½	49·5	TRIER (Main Station)	—	*Main Station.* 2 platforms. 4 passenger lines. Bays N. & S. ends. *East of passenger station.* Goods station; large transhipping shed; several DES. with good road access. SER. Wb (40 t.). Cr (25 t.) SY. C.6 LS. *North of passenger station.* RpS. for locomotives. Goods and passenger rolling stock—approx. number of staff employed, including operating staff at Konz, 1,292. ES (small) roundhouse. Tbl. W. For aerial view of Trier, see Appendix 5. J (facing) right with ST. s.o. line to Bullay.
32½	52·1		—	Line branches West to Ehrang.
32½	52·5		Bridge over arterial road and R. Moselle	277·6 m. long. See Appendix 20.
33	53·2	PFALZEL	Bridge over tributary of Moselle	Passenger station only.
			2 bridges over roads	
34	54·8		—	Line joins DT s.o. line from Wasserbillig.

Distance from Apach Miles	Kms.	Station	Engineering Works	Details and Facilities
34½	55·7	EHRANG	—	SER. Wb (40 t.). Cr (3·5 t.). MY. ES.
				MY—hump—capacity 4,000 wagons per 24 hours. Main yard—W. of line c. 40 LS. (Marshalling for South direction) and 30 LS. (reception)—E. of line—group of 20 LS.—south end of yard—2 ES. (medium)—roundhouse—? removed.
				N. of Yard. 2 ES (large)—roundhouse, Tbl. —Workshops attd. For aerial view, see Appendix 8.
				J for lines (South) from Luxembourg, France and Saar region; (North) for line to Koblenz and Euskirchen.
34½	56·1		—	J (facing) left with DT. s.o. line to Euskirchen.
35	56·3		Bridge over tributary of Moselle	
			—	J (facing) right with ST. s.o. DE line to Insel. c. 4·4 km.
35½	57·4		Bridge over arterial road Road overbridge	
36½	58·7	QUINT	—	Passenger traffic only.
			Bridge over valley	570 m. long; spans 24×19·6; concrete construction.
36½	59·2		Tunnel	c. 1 km. long. Line leaves R. Moselle.
			Road overbridge	
38½	61·5	SCHWEICH	—	SER.
38½	62·5		Bridge over road	
41	66·2	FOHREN	—	Passenger station with restricted goods facilities.
42½	68·7	HETTERATH	—	SER. Wb (40 t.).
45	72·5	SEHLEM	—	Passenger station with restricted goods facilities.
46½	74·4		Road overbridge	
	75·4		Bridge over R. Salm	
47	76·6	SALMROHR	—	SER.
51½	82·9		Bridge over Lieser	
52	84·0			J (trailing) left with ST. s.o. line from Daun and Gerolstein (J. for DT. s.o. line from Daun and Gerolstein (J. for DT. s.o. line, Ehrang—Euskirchen).
				J (trailing) with ST s.o. line from Berncastel.
52½	84·1	WERGERORR	—	SER. Wb (40 t.). Terminus for ST line from Berncastel (E.) and Gerolstein (W.).
53½	86·4		Bridge over main road	
55½	89·6	URSIG	—	SER. Wb (40 t.). Cr (5 t.).
			Tunnel	c. 550 m. long. Line runs along R. Alf to Pünderich.

Distance from APACH *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
58½	94·0	BENGEL	—	SER.
59	95·0		Bridge over stream	
60½	98·0		—	J (trailing) right with ST s.o. DE. line from Traben Trabach.
61	98·3	PÜNDERICH	—	Passenger halt. Terminus ST s.o. DE line (South) to Traben—Trabach.
62½	100·5		Tunnel	*c.* 700 m. long.
62½	101·2		Bridge over Moselle	*c.* 350 m. Line follows right bank of Moselle.
63½	101·9	BULLAY	—	SER. Wb (40 t.). Cr (5 t.). Terminus for ST. s.o. line (South) to Trier.
65½	105·6		Bridge over tributary of Moselle	
66	106·1	NERF	—	Passenger station with limited goods facilities.
66½	106·6		Tunnel	*c.* 500 m. long.
66½	107·2		Bridge over Moselle	*c.* 300 m. long.
66½	107·6	ELLER	—	SER. Wb (40 t.). Cr (5 t.).
67½	108·4		Bridge over tributary of Moselle	
67½	108·5		Kaiser-Wilhelm Tunnel Bridge over R. Endertbach	4·4 km.
70½	113·4	KOCHEM	—	SER. Wb (40 t.). Cr (3 t.). ES (20). Line again follows left bank of Moselle, crossing several tributaries of Moselle en route.
72½	116·2		Bridge over Kalderbach (tributary of Moselle)	
72½	116·7	KLOTTEN	—	Passenger station with limited goods facilities.
74½	121·3		Bridge over Pommerbach	
75	121·6	POMMERN	—	Passenger station with limited goods facilities.
77½	124·3	KAIDEN (TREIS)	—	SER. Wb (40 t.). Cr (2 t.).
77½	124·6		Bridge over tributary of Moselle	
79½	127·5	MÜDEN (MOSELLE)	—	Passenger station with limited goods facilities.
80½	129·4		Bridge over Elzbach	
81	130·3	MOSELKERN	—	Cr. (3 t.).
82½	132·3	BURGEN	—	Limited goods facilities.
83½	134·3	HATZENPORT	—	SER. Wb (40 t.). Cr (5 t.).
83½	134·9		Bridge over stream	
85½	137·4	LOF (BRODENBACH)	—	Passenger station with limited goods facilities.
87	140·3	KATTENES	—	Wb (40 t.).
89½	144·2	LEHMEN	—	Passenger station with limited good facilities.
90½	146·0	KOBERN—GONDORF	—	SER. Wb (40 t.). Cr (5 t.).
95	153·0	WINNINGEN (MOSELLE)	—	SER. Cr (5 t.).

Distance from APACH		*Station*	*Engineering Works*	*Details and Facilities*
Miles	*Kms.*			
97¼	156·8	GÜLS (KOBLENZ)	—	SER. Wb (40 t.). Line turns E. to cross Moselle.
97½	157·2		Bridge over Moselle	262 m. long; 5 spans.
98½	158·2	MOSELWEISS	—	Passenger station only.
98½	158·4		Bridge over road	
98½	158·6		Bridge over railway	Line crosses DE. spur to ES. N. of goods station
99½	159·9	COBLENZ (MOSELLE)	—	Goods only. SER. Wb (50 t.). Cr (5 t.). 2 DES. *c.* 10. LS. *c.* 400 m.
99½	160·0		—	Private siding connection to riverside works. *South of line*:—SY. *c.* 18 LS. *c.* 400-500 m. long. ES (large) roundhouse.
99½	160·0		—	J triangular, with DT. s.o. line to Koblenz (Lutzel) and Köln. Line turns South to Main Station.
100	161·1	KOBLENZ	—	Passenger station only. 3 platforms (island). South of Station—ES (small) roundhouse, Tbl. W. Junction for line North from Köln. South to Mainz, Wiesbaden, Frankfurt, via Bingerbrück (Route 54), via Rüdesheim (Route 53). East to Limburg and Frankfurt (Route 52); also Limburg and Kassel. Koblenz (Lutzel) MY. *c.* 2·5 km. N. of main stations. Cr. (15 t.). SER. Wb (50 t.). 14 LS. 2 groups of *c.* 14 LS. each and 6 DES. (Sorting sidings). Capacity *c.* 2,600 per 24 hours. ES (medium) roundhouse.

ROUTE 52

KOBLENZ—LIMBURG—FRANKFURT

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 12.·2 km. (75¼ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but line follows valleys and rivers RHINE and LAHN to LIMBURG, with several tunnels after NASSAU. After LIMBURG follows tributary. Highest contour line (400 m.) after IDSTEIN, 81·5 km.
6. *Curvature :* At 15·5 curve *c.* 400 m. radius inside river bend. At 64·1 curve *c.* 550 m. radius, length *c.* 500 m. At 105·1, line branches sharply N.E. to FRANKFURT. Most numerous curves in section NIEDERLAHNSTEIN (4·6 km.)—DIEZ (48 km.).
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·0 km. (4¼ miles) (OBERNHOF—LAURENBURG (LAHN)).
9. *Marshalling Yards (MY.) :* KOBLENZ.
   FRANKFURT.
10. *Engine Sheds (ES.) :* LIMBURG.
    NIEDERLAHNSTEIN.
    KOBLENZ.
    FRANKFURT.
11. *Watering facilities :* No information.
12. *Vulnerable points :*
    (*a*) Marshalling and Locomotive Facilities referred to in paras. 9 and 10.
    (*b*) Junctions at KOBLENZ, NIEDERLAHNSTEIN (4·6 km.), DIEZ (40·5 km.), ESCHOFEN (54·8 km.), FRANKFURT (109·8, 111·5, 113·2, 117·4 and 118·0 km.).
    (*c*) Bridges—the most important are those over the RHINE at 1·8 and 2·3 km.; in addition, the line frequently crosses the LAHN.
    (*d*) Tunnels—the line is particularly vulnerable in this respect, owing to the frequency of tunnels between NIEDERLAHNSTEIN and LIMBURG.
13. *Capacity :* 60 trains per day each way, of 300/350 tons net train load each.

Distance from KOBLENZ

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KOBLENZ	—	Main passenger station. MY 2,600 wagons per 24 hours. ES. J for lines (1) North to Köln, (2) West to Trier and Luxembourg (Route 51), (3) South to Mainz, Wiesbaden and Frankfurt, via Bingerbrück (Route 54) and via Rüdesheim (Route 53). Goods station on Trier line, SER. Wb (50 t.). Cr (5 t.). For air photograph of Koblenz, see Appendix 11.
½	0·2		—	J (facing) left with DT s.o. line to Bingerbrück (Route 54).
½	0·7		Road overbridge	—
¾	1·3		Bridge over railway	Line passes over DT s.o. line to Bingerbrück (Route 54).
1	1·8		Bridge over arm of Rhine	*c.* 110 m. long.
1½	2·3		Bridge over Rhine and railway	384 m. long; spans 2×107 m., 4×45 m. See Appendix 20.
			—	Line crosses DT line Köln—Rüdesheim—Frankfurt.
				J (facing) left with loop connection to DT s.o. line to Köln. Line turns S. to run along R. bank of Rhine.
1¾	2·8	HOCHHEIMERBRÜCKE		
4½	4·3			J (trailing) right with DT s.o. line from Köln.

Distance from Koblenz		Station	Engineering Works	Details and Facilities
Miles	*Kms.*			
2¾	4·6	NIEDERLAHNSTEIN		ES. Rectangular 10/5. Turntable.
				J (facing) right with DT s.o. line Rüdesheim—Frankfurt. (Route 53.)
				Line branches East and proceeds along course of R. Lahn.
4	6·4		Bridge over R. Lahn	Skew. *c.* 400 m. long.
			—	J (trailing) right with loop connection to DT s.o. line Koblenz—Rüdesheim—Frankfurt. (Route 53.)
6½	10·0	FRIEDRICHSSEGEN.	—	—
8½	13·7	NIEVERN		
9½	15·5	EMS—LINDENBACH	—	—
				Curve *c.* 400 m. radius inside river bend.
10¾	17·3	BAD—EMS	—	—
13	20·9	DAUBENAU	—	—
15½	24·7		Bridge over Lahn	
15½	25·2	NASSAU (LAHN)	—	—
16½	26·8		Tunnel	*c.* 500 m. long.
17½	27·6		Tunnel	*c.* 850 m. long.
				Line resumes open on left bank of river.
18¾	29·5	OBERNHOF		—
18½	29·7		Tunnel	*c.* 600 m. long.
22	35·4		Tunnel	*c.* 500 m. long.
22½	36·4	LAURENBURG (LAHN)	—	—
25½	40·6		Tunnel	*c.* 700 m. long.
26½	42·3	BALDUINSTEIN	—	—
27	43·4		Bridge over Lahn	—
28½	45·4		Bridge over Lahn	—
28½	45·7	FACHINGEN (LAHN)	—	—
28½	46·0		Tunnel	*c.* 550 m. long.
29½	47·2		Bridge over R. Aar	—
29¾	48·0	DIEZ	—	—
				J (facing) right with ST s.o. line to Wiesbaden.
30¾	49·5		—	J (trailing) left with DT s.o. line from Staffel. (J for ST s.o. lines from—(1) Westerburg; (2) Montabaur
32	51·5	LIMBURG (LAHN)	—	ES (25/30.)
34	54·8	ESCHOFEN	—	—
				J (facing) left with DT s.o. line to Giessen.
				Line leaves Lahn and turns south along valley of tributary.
36	57·8	LINDENHOLZHAUSEN	—	—
37	59·7		Road overbridge	—
37½	60·2		Bridge over R. Wors	—
37¾	60·9	NIEDERBRECHEN	—	—
39½	63·1	OBERBRECHEN	—	—
39¾	64·1		—	Curve *c.* 550m. radius, length *c.* 500 m.
41¾	67·1	NIEDERNHAUSEN	Bridge over road	—
			Road overbridge	—

Distance from KOBLENZ *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
44½	71·9	KAMBERG (NASSAU)	Road overbridge	—
45½	73·6		Bridge over road	—
47½	76·6	WORSDORF		—
48	77·1		Bridge over road	—
48½	77·8		Bridge over road	—
50½	81·5	IDSTEIN	Road overbridge	—
52	85·0	NIEDERSEELBACH	—	—
53½	86·0		Bridge over stream (Dais)	Line follows course of Dais to Eppstein where stream joins the Schwarz.
54	87·0		Road overbridge	—
			Road overbridge	—
55½	89·3	NIEDERNHAUSEN	—	—
55½	89·9		Road overbridge	—
56	90·2		—	J (facing) right with ST s.o. line to Wiesbaden.
57½	92·1		Tunnel	*c.* 100 m. long.
57½	92·6	NIEDERJOSBACH	—	—
59½	95·9	EPPSTEIN	—	—
60	96·7		Bridge over road and R. Schwarz	—
60½	97·7		Bridge over road and R. Schwarz	
62	100·0	LORSBACH	—	—
64½	104·2	HOFHEIM (TAUNUS)	—	—
65½			—	Line turns sharply N.E. to Frankfurt.
65½	105·5		Bridge over R. Schwarz	—
66½	106·6	KRIFTEL	Road overbridge	—
68½	109·8		—	J. (facing) left to Goods station (Frankfurt Hochst.)
68½	109·9		Flyover	Line passes under DT. s.o. line from Rüdesheim and Koblenz. (Route 53.)
69½	111·5		—	J. (trailing) from right with DT. s.o. line from Rüdesheim. (Route 53.)
69½	111·9	FRANKFURT—HÖCHST.	—	—
70½	113·2			J. (facing) left with DT. s.o. line to Main Goods Station (N. of main passenger station)—see Route 53.
70½	113·9	FRANKFURT—NIED		Rps. Locos. Total staff 1,470.
72½	116·7	FRANKFURT—GRIESHEIM	—	—
73	117·4		—	J. (triangular) right with DT. s.o. line from Ringerbrück (Route 54), also to Hanau, Würzburg, Ansbach (for München. (Route 86.)
73½	118·0			
73½	118·5		Flyover	Line passes under DT. line from Main Goods Station (see Route 53 for details).
75½	121·2	FRANKFURT (Main Station)	—	Terminus of routes 52/4 from Koblenz, 67 from Karlsruhe. For description of station, see Route 53.

ROUTE 53

KOBLENZ—RÜDESHEIM—WIESBADEN—FRANKFURT

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 134·6 kms. (83½ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but line mostly follows course of R. RHINE and R. MAIN, so few gradients to be expected.
6. *Curvature :* No details available, but curves easy except between BRAUBACH and KAMP.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 10·6 km. (6½ miles) (ST. GOARSHAUSEN—KAUB).
9. *Marshalling Yards :* FRANKFURT OST.
   FRANKFURT MAIN.
   OBERLAHNSTEIN.
   WIESBADEN (BIEBRICH—OST.)
10. *Engine Sheds (ES.) :* NIEDERLAHNSTEIN.
    OBERLAHNSTEIN.
    WIESBADEN.
11. *Watering facilities :* No information.
12. *Vulnerable points :*
    (*a*) Marshalling Yards and Locomotive Facilities referred to in paras. 9 and 10.
    (*b*) Main Junctions at KOBLENZ, RÜDESHEIM, WIESBADEN and FRANKFURT.
    (*c*) Bridges. The line is particularly vulnerable in this respect, owing to the numerous bridges, the principal of which are at 1·8 km. (over R. RHINE), 5·6 km. (over R. LAHN), and 127·2 km. (over R. NIDDA).
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distances from KOBLENZ

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KOBLENZ HBF	—	Restricted goods facilities. SR.
				Main passenger station.
				J. for lines (1) North to Köln ; (2) West to Trier and Luxembourg (Route 51) ; (3) South to Mainz, Wiesbaden and Frankfurt, via Bingerbrück (Route 54), and East to Frankfurt, via Limburg (Route 52.)
				For air photograph of Koblenz, see Appendix II.
	0·2		—	J (facing) left with DT s.o. line to Bingerbrück (Route 54).
¼	0·7		Road overbridge	—
½	1·3		Bridge over railway	Line passes over DT s.o. line to Bingerbrück (Route 54).
1	1·8		Bridge over arm of Rhine	*c.* 210 m. long.
1¼	2·3		Bridge over Rhine, railway, and road	Bridge 384 m. long. Spans 2×107 m., 4×25 m. ; Height 18·5 m. Built 1876/79 ; strengthened 1911. Two tracks. Two main steel arch spans, beneath track, on stone piers ; also four stone arch approach spans.
				Line crosses DT line, Köln—Rüdesheim—Frankfurt.
				J (facing) left with loop connection to DT s.o. line to Köln. Line turns south to run along river bank of Rhine.
1¾	2·8	HORCHHEIM	—	Restricted goods facilities.
2¼	4·3		—	J (trailing) right with DT s.o. line from Köln.

Distance from KOBLENZ

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
4½	4·0	NIEDERLAHNSTEIN	—	SER. Wb (32 t.). Cr (3 t.). ES. Rect. 10/5 turntable.
				J (facing) left with DT s.o. line to Limburg and Frankfurt (Route 52).
3½	5·6		Bridge over R. Lahn	—
3⅜	6·2			J (trailing) left, loop connection from DT s.o. Limburg—Frankfurt line (Route 52).
4	6·5	OBERLAHNSTEIN	—	SER. Wb (40 t.). Cr (10 t.). MY 2,000 per 24 hours. ES 20/5 Roundhouse. Turntable.
			Bridge over road	Straight section to Braubach.
5⅞	9·4		2 road bridges and bridge over R. Schlier	—
6¼	10·1			J (facing) left, light railway to Nastätten.
6½	10·5	BRAUBACH	—	SER. Cr (10 t.). Wb (40 t.). Line follows curve beside Rhine to Osterpai.
10⅛	16·4	OSTERPAI	—	SR (for cattle only). Line curves in opposite direction to Kamp.
13⅛	22·3	KAMP (RHEIN)	—	SER.
17	27·6	KESTERT	Bridge over R. Stern	SER. Short curve S.E. and then S.
20	32·1		Bridge over R. Wellmicher	—
21⅛	34·2	ST. GOARSHAUSEN	—	SER. Wb (40 t.).
			Bridge over R. Hasen	J (facing) left, light railway to Nastätten.
21⅝	34·9		Bridge over Schweizer valley	—
22⅛	36·4		Tunnel under Lorelei	200 m. long.
24	38·6		Bridge over stream	—
24⅛	39·3		Tunnel under Rosa-Stein	About 150 m. long.
27⅛	44·2		Bridge over Blücher valley	—
27⅞	44·8	KAUB	Bridge over stream	SER. Wb (32 t.). Cr. (3 t.).
29⅞	47·8		—	Short curve.
30	48·4	LORCH HAUSEN	—	Restricted goods facilities. Train goes through village.
			Bridge over stream	
31⅛	50·5		Bridge over R. Wisper	—
31⅞	51·3	LORCH (RHEIN)	—	Cr. (3 t.). Wb (32 t.). SER.
34	54·9		Bridge over stream	—
36⅛	58·4		Bridge over stream	Rack-and-pinion railway to Niederwald.
36⅛	58·9	ASSMANNSHAUSEN	—	SER. Cr (3 t.).
				Line takes wide curve to Rüdesheim.
39⅛	63·1	RÜDESHEIM (RHEIN)	—	SER. Wb (40 t.). Cr. (3 t.). Line curves inwards to Geisenheim.
				J (facing) right, loop line to riverside under Rhine bridge.
39⅞	64·0		—	J (facing) right, loop line from Rhine bridge.
40⅛	64·6		—	J (trailing) right, loop line from Rhine bridge.

Distance from KOBLENZ *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
41½	67·1	GEISENHEIM	—	Cr. (3 t.). Wb (32 t.). SER.
			Bridge over stream	—
42½	68·4		Bridge over road	—
43	69·4		Bridge over stream	—
44½	71·4	OESTRICH-WINKEL	—	SER. Cr (3 t.). Wb (32 t.).
44½	72·2		Bridge over stream and valley (Pfingstbach)	—
46½	74·5	HATTENHEIM	—	SER. Cr. (3·5 t.).
46½	74·8		Bridge over stream	—
47½	77		Bridge over stream	—
48½	77·6	ERBACH (RHEINGAU)	—	SER. Cr. (2·5 t.).
49	79		Bridge over stream	Steam-tramway to Schlagenbad (8 km. North).
49½	79·6	ELTVILLE	—	SER. Cr (5 t.). Wb (40 t.).
			Bridge over stream	
			—	Straight section from Eltville to R. Wallu..
50½	82·1		Bridge over R. Walluf	
51	82·6	NIEDERWALLUF	—	SER. Wb. (40t.).
52½	84·2		Bridge over stream and road	—
53½	85·9	WIESBADEN-SCHIERSTEIN	—	SER. Cr (3 t.). Wb (40 t.).
			Railway crosses roads	—
55½	89	WIESBADEN-BIEBRICH	—	SER. Wb (32 t.).
55½	89·3		Road overbridge	—
56	90		—	J (facing) left, DT s.o. long line to Wiesbaden Hbf.
59½	96·2		—	J (trailing) left, ST to Zollhaus.
58	93·3	WIESBADEN HBF	—	SER. Wb (40 t.).
				ES. 30/35. 2 roundhouses. 2 turntables.
				Terminus of ST s.o. lines from (1) Diez, Junction for DT line, Koblenz to Limburg; (2) Niedernhausen, J. for DT s.o. line, Limburg—Frankfurt.
60	96·8	WIESBADEN OST	—	Passenger station only.
				Wb (30 t.). SER.
				MY.
60½	97		Road overbridge	For air photograph of Wiesbaden, see Appendix 19.
60½	97·5		—	J (facing) left, DT s.o. loop line to Mainz (Routes 54 and 60).
61	98·3		—	Line passes under DT s.o. Wiesbaden—Mainz loop, and under DT Mainz—Frankfurt Hoechst line.
62	99·8		Road overbridge	—
62½	100·1	MAINZ-KASTEL	—	Wb (40 t.) SER. Cr (10 t.).
63½	101·9		Bridge over road	—
64½	103·4		—	J (trailing) left DT s.o. line from Mainz to Bischofsheim.
65½	105·1		Bridge under Mainz line	
66	106·1	HOCHHEIM (MAIN)	—	Cr (2 t.). SER. Wb (33 t.).
66	106·3		Bridge over road	
70	112·5		Bridge over road	—

Distance from KOBLENZ				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
70	112·7	FLÖRSHEIM (MAIN)	—	SER. Wb (30 t.).
70	112·8		Bridge over road	—
71½	115·3		Bridge over main motor road	Straight section almost to Frankfurt—Hochst (11 km.).
71⅝	115·7	EDDERSHEIM	—	Passenger station only.
74⅛	119·7	HATTERSHEIM (MAIN)	—	SER. Wb (40 t.).
74⅛	120		Bridge over stream	—
74⅛	120·2		Road overbridge	—
76	122·4	FRANKFURT HÖCHST.-WEST	—	Restricted goods facilities.
76⅛	123·4		—	Line passes under DT s.o. line from Limburg. (Route 52.)
77⅛	124·4		—	J (trailing), left, with minor branch line from Königstein.
77⅝	125·2	FRANKFURT HÖCHST.	—	SER. Wb (60 t.). Cr. (15 t.).
78	125·4		—	J (facing) left, ST line to Bad Soden (5·5 km.).
78⅛	126·7		—	J (facing) right, DT loop line to Frankfurt (Nied and Griesheim). (Route 52.)
	127·2		Bridge over R. Nidda (*c.* 100 m.)	—
81⅛	130·7		Bridge over main motor road	J (facing) left, minor branch line to Cronberg (8·5 km.).
81⅝	131·7		—	J (facing) right, DT loop to Frankfurt.
82⅝	133·2		—	J (facing) left, DT connection to Darmstadt—Frankfurt line. (Route 67.)
83⅛	134·6	FRANKFURT (MAIN)	—	SER. Wb (51 t.). Cr (25 t.). MY. (North of station.) Capacity 2,700 per 24 hours. MY. (OST.) Capacity 2,700 per 24 hours. Rps (locomotives) at Frankfurt—Nied. Loco. Depot (West of station). 2 ES (large) roundhouse. 1 ES (large) rectangular. Tbls. For air photograph, see Appendix 17.

ROUTE 54

KOBLENZ—BINGERBRÜCK—FRANKFURT. (Also MAINZ—WIESBADEN)

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 129·2 kms. (80¼ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* Route follows course of R. RHINE and R. MAIN, so few gradients to be expected.
6. *Curvature :* Sharp left curve at SPAY (12·2 km.) following course of river, otherwise normal curves.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 8 kms. (5 miles) (RAUNHEIM—KELSTELBACH).
9. *Marshalling Yards (MY) :* KOBLENZ. BINGERBRÜCK. MAINZ-BISCHOFSHEIM. FRANKFURT (2).
10. *Engine sheds (ES) :* KOBLENZ. BINGERBRÜCK. MAINZ. MAINZ-BISCHOFSHEIM. WIESBADEN. FRANKFURT.
11. *Watering facilities :* No details available.
12. *Vulnerable Points :*
    (*a*) Marshalling Yards and Engine Sheds referred to in paras. 9 and 10.
    (*b*) Tunnels at 34·5, 36·3, 37·8 and 91·7 kms.
    (*c*) Bridges—Main bridges are at 155·1 km. over NAHE, at 90·2 and 94·5 km. over RHINE, and 127·6 km. over MAIN. In addition, several bridges exist between KOBLENZ and BINGERBRÜCK, over tributary of RHINE.
    (*d*) Main Junctions at KOBLENZ, BINGERBRÜCK, MAINZ, WIESBADEN and FRANKFURT.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distances from KOBLENZ

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KOBLENZ	—	Main passenger station. Restricted goods facilities. SR.
				For air photograph, see Appendix 11.
				MY—Moselbf. (capacity 2,600 wagons per 24 hours.) Lutsel
				Loco. depots at each yard. For description, see Route 51. J for, lines (1) N. to Köln; (2) W. to Trier and Luxembourg (Route 51); (3) S. to Mainz, Wiesbaden and Frankfurt, via Bingerbrück (Route 54) and via Rüdesheim (Route 53); (4) E. to Limburg and Frankfurt (Route 52).
				Goods station on Trier line. SER. Wb (50 t.). Cr (5 t.).
0	0·2			J (facing) right with DT s.o. line to Frankfurt, via Limburg (Route 52).
½	1·0		Railway overbridge	Line passes under DT s.o. line to Limburg and Frankfurt (Route 52). Line follows left bank of R. Rhine to Frankfurt.
2½	3·6		Bridge over road	—
3½	5·3	KAPELLEN—STOLZENFELS	—	SR.
3¾	6·0		Bridge over road	—
4¾	7·7		Bridge over road Bridge over stream	—
5½	8·6	RHENS	—	SER.
7½	11·8		Bridge over road	—
				Line curves right following R. Rhine.

Distances from KOBLENZ

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
7½	12·2	SPAY	—	Restricted goods facilities.
				Line curves sharply east, following bend in Rhine.
			Bridge over R. Mühl	—
				J (trailing) with ST s.o. line from Simmern.
			Bridge over stream	—
12	19·3	BOPPARD	—	Wb (40 t.). Cr (5 t.). SER.
			Bridge over R. Mittelbach	—
15	24·4	SALZIG	—	Restricted goods facilities.
17½	28·2	HIRZENACH	—	Restricted goods facilities.
			Bridge over road	—
19	30·5		Bridge over road	
				Factory.
20	32·2		Bridge over road	—
21½	34·1	ST. GOAR	—	ER.
21½	34·5		Tunnel	On curve; *c.* 300 m. long.
22½	36·3		Tunnel	On curve; *c.* 300 m. long.
23½	37·8		Tunnel	On curve; *c.* 300 m. long.
			Bridge over road	—
			Bridge over R. Niederbach	—
			Bridge over R. Oberbach	—
25½	40·8	OBERWESEL	—	Wb (40 t.). Cr (3 t.). SER.
26½	43·0		Bridge over road	—
28	45·1		Bridge over road	—
29	46·9		Bridge over R. Blüchertal	—
29½	47·2	BACHARACH	—	Wb (40 t.). Cr (2 t.). SER.
31½	50·7	NIEDERHEIMBACH	—	Cr (3 t.). SER (less than 7 m. long).
36½	55·3	TRECHTINGSHAUSEN	—	Restricted goods facilities.
			Bridge over R. Morgenbach	Immediately after station.
				J (facing) right with DT s.o. line to Kreuznach (Route 59).
				J (facing) left with short dead end spur down to river.
37½	60·7	BINGERBRÜCK	—	Wb (60 t.). Cr (5 t.). SER.
				MY 2,000 wagons per 24 hours. ES (20/25) roundhouse. Turntable.
38	61·0		Bridge over R. Nahe	*c.* 300 m. long.
38½	62·1	BINGEN (RHINE)	—	Junction station.
				Wb (50 t.). Cr (3 t.). SER. Valley of R. Rhine now wide.
40½	65·0		Railway bridge over line	This bridge carries DT s.o. line from Rüdesheim on the right bank of the R. Rhine across the river and the Koblenz—Mainz line (left bank) and on to Bad Kreuznach. There is also a connection between these two lines near Gau Algesheim.
				J (facing) right with DT s.o. line to Armsheim and on to Alzey. At Alzey there is a loco. depot.
			Road overbridge	—

Distance from Koblenz Miles	Kms.	Station	Engineering Works	Details and Facilities
40½	65·6	Gaulsheim	—	Restricted goods facilities.
				J (trailing) right with connection from Rüdesheim–Bad Kreuznach line.
			Bridge over stream	—
43½	70·5	Gau Algesheim	—	Wb (40 t.). Cr (2 t.). SER.
45	72·3		Flyover	Dead end ST s.o. line from Ingelheim Rheinbf.–Jugenheim-Partenheim (21·5 km.).
			Bridge over road	—
65½	73·4		Bridge over R. Selz	—
45½	73·7	Ingelheim	—	Wb (40 t.). Cr (2 t.). SER.
			2 bridges over road	—
			Bridge over stream	—
49	78·7	Heidesheim (Rheinhessen)	—	Wb (33 t.). Cr (3 t.). SER.
50½	81·4	Ueberbohn	—	Passenger station only.
52½	84·3	Budenheim	—	Wb (40 t.). Cr (2 t.). SER.
			Bridge over road	—
			—	Line curves right following river.
55	88·4	Mainz—Mombach	—	Wb (40 t.). Cr (5 t.). SER.
55½	89·0		—	J (facing) left with DT s.o. line to Wiesbaden.
			Bridge over road	—
55½	89·7		—	J (trailing) right with ST s.o. line from Armsheim.
				J (trailing) left with DT s.o. line from Wiesbaden.
			Bridge over road	—
				J (trailing) with DT connection from line to Wiesbaden.
				J (trailing) left with subsidiary line from goods station (Mainz Hafen) and docks.
			Bridge over road	—
			Road overbridge	
		Mainz Hafen	—	Goods station. Wb (35 t.). Cr (5 t.). SER.
57	91·7	Mainz (Main station)	—	Wb (60 t.). Cr (10 t.). SER. ES (20/25) roundhouse. Turntable.
			Road overbridge	
			Tunnel between Mainz main station and Mainz Süd	1,193 m. long.
58	93·5	Mainz Süd	—	—
58½	93·8		—	J (facing) left with DT s.o. line to Worms.
				J (facing) right with connection to Worms line.
58½	94·5		Bridge over line	Line passes over DT s.o. line to Worms.
59	94·8		Bridge over R. Rhine	Near its junction with R. Main, 4 arches, each c. 104·90 m. span with approach spans on both banks. Total length 1,020 m. For sketch, see Appendix 20. Line follows valley of R. Main to Frankfurt.

Distance from Koblenz		Station	Engineering Works	Details and Facilities
Miles	*Kms.*			
59½	96·2	MAINS—GUSTAVSBURG	—	Wb (40 t.). Cr (5 t.). SER.
61	98·3		Flyover	Connecting DT line from Mainz—Wiesbaden line.
				J (trailing) right with line above.
62	99·9	MAINS—BISCHOFSHEIM	—	Wb (40 t.). SER.
				MY capacity 3,800 wagons per 24 hours.
				Loco. depot, 50 locos. ES (roundhouse). Turntable.
				J (facing) left and right with short DE spurs.
63	[illegible]		—	J (facing) left with DT s.o. line to Gr. Gerau.
64½	103·9	RÜSSELSHEIM	—	Wb (40 t.). Cr (5 t.). SER.
66½	107·5	RAUNHEIM	—	Wb (40 t.). SER.
71½	115·5	KELSTERBACH	—	Wb (40 t.). Cr (4 t.). SER.
			Road overbridge	—
73½	118·6	FRANKFURT—SCHWANHEIM	—	Restricted goods facilities.
76½	122·7		—	J (trailing) right with DT s.o. line from Biblis.
76½	123·0	FRANKFURT—SPORTFELD	—	SER.
76½	123·7		—	J triangular with DT s.o. line to Offenbach—also to main MY E. of main passenger station. Distance to main MY *c.* 6·6 km. over further bridge across R. Main- 283 m., 4 spans.
78	125·6	FRANKFURT—NIEDERRAD	—	—
79½	127·6		Bridge over R. Main	283 m.—5 spans.
			Bridge over railway	Line crosses loop line from Griesheim.
				J (triangular) with DT s.o. line from Koblenz (Route 52).
			—	J (trailing) left with DT s.o. line from Bad Homburg.
			Railway overbridge	Line passes under DT s.o. line from Main MY.
80½	129·2	FRANKFURT (MAIN)	—	Terminus station. MY N. of passenger station, capacity 2,700 wagons per 24 hours.
				SER. Wb (51 t.). Cr (25 t.).
				Loco. depot N. of passenger station.
				4 ES—1 rectangular, 2 roundhouse, 1 other Tbl.
				Rpa (Frankfurt Nied), locomotives, see Routes 52/3.
				A further MY lies E. of main passenger station on route to Hanau (Route 86)—capacity 2,700 per 24 hours.

Distance from MAINZ—MOMBACH

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
			MAINZ-MOMBACH--WIESBADEN	
55	88·4	MAINZ—MOMBACH	—	Wb (40 t.). Cr (5 t.). SER.
55¼	89·2		—	J (facing) right with DT s.o. line to Frankfurt.
			Flyover	Line crosses flyover connection to DT line to Frankfurt.
55⅝	89·7		—	J (trailing) right with line Wiesbaden—Frankfurt.
				J (trailing) left with flyover connection.
56	90·2		Bridge over R. Rhine	Total length 915 m. 5 main steel arch spans on stone piers—6 central steel girder deck flood spans.
			—	J (facing) right with DT s.o. line to Bischofsheim and Frankfurt.
57	91·7		Bridge over railway	Line crosses main line Biebrich—Frankfurt (Route 53).
58	93·2	BIEBRICH—OST	—	SER. Wb (30 t.).
				J (triangular) left with DT s.o. line to Rüdesheim and Koblenz (Route 53) and West goods station.
				J (triangular) right with ST s.o. line from Mederhausen.
60	96·7	WIESBADEN (Main Station)	—	SER. Wb (40 t.).
				Loco. depot.
				ES 2 roundhouses (medium), 2 Tbls.
				MY at Wiesbaden.

ROUTE 55

WASSERBILLIG—TRIER (WEST)—EHRANG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 15·9 km. (9¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle loads :* 18 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 3·5 km.
9. *Marshalling Yards* (MY) : EHRANG.
10. *Engine Sheds* (ES) : EHRANG.
11. *Watering facilities* (W) : EHRANG—no other details available.
12. *Vulnerable points :*
    (a) Marshalling Yard and Locomotive facilities at Ehrang.
    (b) Junctions at 4·0 km. and 15·2 km.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distance from WASSERBILLIG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
				The line is a continuation of the main route from Paris, via Mézières—Charleville—Longny Wasserbillig.
0	0	WASSERBILLIG	—	SER. Wb (40 t.). Cr (6 t.). Frontier Station. (Distance from Luxembourg 36·9 km.) J (facing) left with ST s.o. line to Ettelbrück.
½	0·6		Bridge over river (Sauer)	c. 200 m. long.
1	1·7		—	J (trailing) left with ST s.o. line from Erdorf. Line proceeds along left bank of Moselle.
2½	3·5	IGEL	—	SER. Wb (60 t.). Cr (3 t.).
2¾	4·0		—	J (facing) right, with DT s.o. line Apach—Koblenz (Route 51)—this loop connection (c. 1·0 km. in length) crosses Moselle by bridge c. 200 m. long.
3	4·8		—	J (triangular) with connection over Moselle to Konz—distance to Konz from Igel 4·6 km. Bridge over Moselle—3 span, total length c. 350 m.
3	5·0		Bridge over arterial road	—
3½	5·4	ZEWEN	—	Passenger station only.
5½	8·4	EUREN	—	Passenger station only.
6½	10·3	TRIER (WEST)	Road overbridge	4-track through passenger station—local traffic only. Wb (60 t.). Cr (5 t.). For layout at Trier, see Appendix No. 7
7½	12·2	PALLIEN	Bridge over tributary of Moselle	Passenger halt.
9¼	14·0	BIEWER	Bridge over river (tributary of Moselle)	Passenger station only.
9½	15·2		—	J (trailing) right with DT s.o. line from Trier South. (Route 51.)

Distance from WASSENBILLIG *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
9¾	15·9	ENRANG	—	SER. Wb (40 t.). Cr (3·5 t.). MY. ES. J for lines from Luxembourg, France and Saar region (Routes 55, 51 and 56 respectively), and North to Koblenz (Route 51) and Euskirchen. MY — Hump yard — capacity 4,000 wagons per 24 hours. *W. of line* main yard *c.* 40 LS (Marshalling sidings for South direction). *c.* 40 LS (reception). *E of Line*—group of 20 LS at S end. 4 ES (medium) roundhouse; but (?) removed. *N end of Yard.* 2 ES (large)—roundhouse—Tbl —Workshops attached. For air photograph, see Appendix 8.

ROUTE 56

TRIER—DILLINGEN—SAARBRÜCKEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 88·3 kms. (54¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but track closely follows course of R. SAAR, so few gradients, if any, to be expected.
6. *Curvature :* No details available, but numerous curves from TRIER to METTLACH (course of R. SAAR).
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·2 km. (3¾ miles) (SERRIG—TABEN).
9. *Marshalling Yards (MY) :* TRIER.
   SAARBRÜCKEN.
10. *Engine Sheds (ES) :* DILLINGEN.
    SAARBRÜCKEN.
    TRIER (Main station).
    KARTHAUS.
    MERZIG.
    VÖLKLINGEN.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (*a*) Marshalling Yards and Engine Sheds referred to in paras. 9 and 10.
    (*b*) Bridges en route—see description of line.
    (*c*) Junctions at KARTHAUS, DILLINGEN, VÖLKLINGEN, SAARBRÜCKEN.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each.

Distance from TRIER

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	TRIER (HBF.)	—	SER. Cr (15 t.). Wb (40 t.). Rps (locos, passenger, goods). Total staff 1,292 (including operating personnel at Konz). ES (30). Roundhouse. Turntable. DT line North to Ehrang, joined on right at 3·2 km. by branch line Trier—Ruwer. At 3·7 km., road overbridge; and immediately afterwards crosses R. Moselle, by bridge about 250 m. long. At 4·2, passenger halt of Pfalzel. Crosses roads, and at 5·9 km. J (trailing) left DT s.o. line Konz—Ehrang (Route 51). Then to Ehrang (7 km.). SER. Wb (40 t.). Cr (3·5 t.). Straight section Pfalzel—Ehrang.
½	0·6		Bridge over roads	—
1	1·7	TRIER (SÜD)	—	Restricted goods facilities.
1½	2·4		Bridge over road	
2½	3·7		Bridge over road	Line follows E. bank of R. Moselle.
3½	5·2		Bridge over road	—
				J (facing) right DT s.o. loop connection over R. Saar with Trier—Luxembourg (Route 51), and also Trier—Apach (Route 51).
4	6·5		Bridge over road	—

Distance from TRIER				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
4	6·7	KARTHAUS	—	SER. ES 25/30. Roundhouse. Turntable.
5	8·1		—	Railway workshops.
5½	8·9		—	J (trailing) right, DT s.o. loop over R. Moselle to Luxembourg—Trier—Koblenz line. (Route 51.)
5½	9·1	KONZ	—	SER. Wb (40 t.). Cr (15 t.).
				Line follows E. bank of R. Saar for 1·7 km. then takes South-Easterly curve to Kanzem.
7½	12·5		Road overbridge	—
8½	13·5	KANZEM	—	Restricted goods facilities. Line turns N.E. for 1·5 km., then curves S. at...
9	14·7		Bridge over road	—
10	16·1	WILTINGEN (SAAR)	—	Cr (5 t.). SER.
10½	17·1		Bridge over road and stream	—
12	19·2		Bridge over road	—
12	19·4	SCHODEN—OCKFEN	—	SER. Cr (1·8 t.).
13	20·8		Bridge over road and stream	—
13½	21·6		Bridge over road	—
14½	23·6	SAARBURG (BEI TRIER)	—	SER. Wb (40 t.). Cr (1·6 t.). Station on S.W.—S.E. curve.
15½	24·9		Road overbridge	—
17	27·2	SERRIG	—	Cr (3 t.).
17	27·6		Bridge over road and stream	—
18½	29·8		—	Line follows curves of R. Saar to Mettlach.
20½	33·2	TABEN	—	Wb (40 t.). SR.
23½	37·6		Bridge over stream	—
24	38·6	SAARGÖLLEBACH	—	Wb (40 t.).
24½	39·2		Bridge over road and stream	—
26	41·7	METTLACH	—	Wb (30 t.). Cr (6 t.). SER.
26½	42·5		Tunnel, 1·3 km. long (St. Gangolf)	—
27½	43·9	BESSERINGEN	—	—
				Straight section almost to Merzig.
30½	48·8		Bridge over stream	—
30½	49·2	MERZIG (SAAR)	—	Wb (40 t.). SER. Cr (5 t.). ES 20. Several sidings.
				St line from Nonnweiler enters station from left, crossing over this route
31	50·1		—	On left, loop of same ST line (crosses R. Saar).
31½	50·5		Road overbridge	—
32½	52·4	FREMERSDORF	—	Restricted goods facilities.
32½	52·6		Bridge over road	—
			—	Follows river bank to Beckingen.
34½	56		Bridge over road and stream	—

Distance from TRIER *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
35	56·4	BECKINGEN (SAAR)	—	Wb (32 t.). Cr (5 t.). SER.
36¼	58·4		—	J (facing) right, DT s.o. line to Busendorf (Route 57).
37	59·4		—	Loop of DT s.o. line from Busendorf crosses over Route 56.
37¼	59·9		Road overbridge	—
37¼	60·2		—	J (trailing) left, with loop of DT s.o. line from Busendorf.
38¼	61·4	DILLINGEN (SAAR)	—	Wb. (30 t.). SER. Cr (5 t.). ES (15/20). Roundhouse. Turntable.
38¼	61·9		Bridge over road	—
38¼	62·1		—	J (facing) left, with ST line to Nonnweiler.
38¾	62·3		Bridge over R. Prims	—
39¼	63·3		Bridge over road	—
40¼	64·8	SAARLAUTERN	—	Wb (40 t.). SER. Cr (7·5 t.). J (facing) left, with ST line to Saarwellingen (5 km.).
40¾	65·6		Road overbridge	—
41¾	67·3		Road overbridge	—
42¼	68·2		Bridge over road and stream	—
42¼	68·7	ENSDORF (SAAR)	—	Wb (30 t.). SER.
43	69·3		—	J (facing) right, with ST s.o. line crossing R. Saar to Lisdorf (1·5 km.).
43¼	70·0		—	J (facing) left, with ST s.o. line to Griesborn (1·7 km.).
44¾	72·2	BUSS (SAAR)	—	Wb (40 t.). SER.
45¼	72·8		—	J (facing) right, with DT line crossing R. Saar to Courcelles (Kurve).
47¼	76·5		—	J (trailing) right, with ST loop connection with DT s.o. branch line to Saarbrücken.
47¾	77		Bridge over road	
48¼	77·6	VÖLKLINGEN	—	Wb (60 t.). SER. Cr (7·5 t.). ES (20). Radial partly covered turntable.
48¼	78·3		—	J (facing) left, with ST s.o. line to Lebach, where it joins DT s.o. line to Neunkirchen.
49	78·8		Road overbridge	—
49	79		—	J (facing) left, with ST s.o. loop connection to Lebach line.
50¼	81·3	LUISEN THAL (SAAR)	—	Wb (30 t.).
51	82·3		Bridge over stream	—
53	85·3		—	J (trailing) left, with ST s.o. line to Grube (3km.).
53¼	85·8	SAARBRÜCKEN—BURBACH	—	SER. Cr (10 t.). Wb (40 t.). J with ST line to Heusweiler (connecting with ST s.o. line to Lebach).
53¼	86·4		—	J (facing) right, with DT line to Remelach.
54¼	87·2		—	J (trailing) right, with DT loop connection to Remelach line.
54¼	87·8		Rail overbridge	J (facing) left, with DT s.o. line to Neunkirchen.
54¼	88		Rail overbridge	DT s.o. line crosses Route 56 to join Neunkirchen—Remelach line.
54¼	88·2		—	J (facing) left with ST loop to main station.
54¼	88·3	SAARBRÜCKEN HBF.	—	SER. Wb (40 t.). Cr (20 t.). MY. ES (60/80). Rectangular. Turntable. (Probably half destroyed.)

ROUTE 56A

BOUS (BUSS)—WEHRDEN—SAARBRÜCKEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 18·5 km. (11½ miles).
3. *Track :* Buss to J. 0·5—Single.
   Thence to SAARBRÜCKEN—Double.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available, but track mainly follows course of R. SAAR, and sharp gradients are unlikely.
6. *Curvature :* No details available, but no sharp curves.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·4 km. (3¼ miles) (FURSTENHAUSEN—GERSWEILER).
9. *Marshalling Yards (MY) :* SAARBRÜCKEN.
10. *Engine Sheds :* SAARBRÜCKEN.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (a) Marshalling Yard and Engine Sheds at SAARBRÜCKEN.
    (b) Bridges on route—the most important are those over the SAAR at 0·7 and 15·8 km.
    (c) Tunnel at 14·7 km.
    (d) Junctions at Buss, HOSTENBACH, and in the SAARBRÜCKEN area.
13. *Capacity :* Short (½ km.) ST section at Buss will not materially reduce practicable capacity. 40 trains per day each way, of 400/450 tons net train load each.

Distance from
Bous (Buss)

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0		—	Continuation of Route 56 from Trier to Buss (Trier—Buss 7·2 km.).
0	0	BUSS (SAAR)	—	SER. Wb. (40 t.). Line runs ST to J at 0.5.
½	0·5		—	J (facing) left, with DT s.o. line to Saarbrücken, via Burbach (Route 56).
½	0·7		Bridge over R. Saar	c. 100 m. long.
¾	1·1		—	J (triangular) with DT s.o. line from Hargarten (Route 58). Line runs along left bank of Saar.
1½	2·4	HOSTENBACH	—	Passengers only.
2½	4·0		—	J (facing) right, with ST loop connection to Völklingen.
			Flyover	Line crosses loop referred to above.
3	4·7	WEHRDEN (SAAR)	—	—
			Road overbridge	—
● 3½	5·5		Bridge over stream	—
4	6·4		—	J (trailing) right, with ST DE line from Gr. Rosseln.
5½	8·8	FURSTENHAUSEN	—	SER. Wb (30 t.). Cr (12 t.).
6½	10·0		Bridge over road	—
8¾	14·2	GERSWEILER	—	SER. Wb (30 t.).
9	14·7		Tunnel	c. 300 m.
9½	15·4		Flyover	Line passes over DT s.o. line from Beningen (Route 59).
9¾	15·7			J (trailing) left, with DT s.o. line from Beningen.
10	16·4			J (facing) left, with DT s.o. line to Saarlouis and Trier (Route 56).

Distance from Bous (Buss)

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
10½	16·5	GERSWEILER (cont.)	Bridge over railway	Line passes over loopline to MY.
10½	16·7		—	Line turns E. to Saarbrücken and runs as 4-track parallel with DT s.o. line from Trier.
10½	16·8		—	J (facing) left with DT s.o. line to Neunkirchen, via Schiffweiler.
10½	17·2		Flyover	Line passes under DT s.o. line to Neunkirchen, via Schiffweiler.
11	17·8		Bridge over railway	Line passes under loop line to MY.
11½	18·5	SAARBRÜCKEN	—	SER. Wb (40 t.). Cr (20 t.). 5 passenger platforms (4 island).
				N. of Station. Loco. depot—2 ES (large) rectangular, and roundhouse. Tbl. W. Rps. (locomotives).
				MY. See Route 59.

ROUTE 56B

VÖLKLINGEN—LEBACH

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 21·9 km. (13½ miles).
3. *Track :* Single from VÖLKLINGEN Junction to LEBACH Junction.
4. *Maximum permissible axle load :* 17 metric tons.
5. *Gradients :* Gradient rising to North.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 3·6 km. (2 miles) (HEUSWEILER-EIWEILER).
9. *Marshalling Yards (MY) :* None on route, but small shunting yard exists at LEBACH.
10. *Engine sheds :* VÖLKLINGEN.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (*a*) Junction and locomotive depot at VÖLKLINGEN, also junction at LEBACH.
    (*b*) Tunnels at 15·6 and 16·9 km.
    (*c*) Bridges on route.
13. *Capacity :* 24 trains per day each way, of 300/350 tons net train load each.

Distance from VÖLKLINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	VÖLKLINGEN	—	SER. Wb (60 t.). Cr (7·5 t.). ES (20). Roundhouse.
¾	1·4		—	J (triangular) with DT s.o. line to Saarbrücken (Route 56). Line runs N.
1¼	2·0	VÖLKLINGEN-HEIDSTOCK	—	Passenger halt.
1½	2·3		—	J (facing) right, with ST s.o. DE line to Victoriaacht Station *c.* 3·7 km.
1¾	2·9		—	—
2¼	3·6		Road overbridge	—
3	5·1		—	—
3¼	5·5	PUTTLINGEN (SAAR)	—	SER. Wb (40 t.). Cr (5 t.).
3¾	6·2		Bridge over road	—
4	6·6		Bridge over stream	—
5	7·9	KÖLL (SAAR)	—	Restricted goods facilities.
5¾	9·4	ETZENHOFEN	—	SER.
6¼	10·3		Bridge over stream	—
6¾	10·9		Bridge over road	—
6¾	11·1	WALPERSHOFEN	—	Passenger halt.
7	11·4		—	—
7¾	12·5	HEUSWEILER	Bridge over stream	SER. Wb (40 t.).
8¾	14·2		Bridge over stream	—
9¼	15·6		Tunnel	*c.* 200 m. long.
			Road overbridge	—
10	16·1	EIWEILER	—	SER.
10¼	16·9		Tunnel	*c.* 300 m. long.
12	19·5	LANDWEILER	—	Restricted goods facilities.
13¼	21·5		—	J (triangular) right, with DT s.o. line Turkismühle—Lebach (Route 57A).
13½	21·9	LEBACH	—	SER. Wb (30 t.). SY (small) left of line.

ROUTE 57

FREISTROFF—BUSENDORF—DILLINGEN
DILLINGEN { NONNWEILER—HERMESKEIL—TRIER / OTZENHAUSEN—TURKISMÜHLE

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 70·5 km. (49⅜ miles).
3. *Track :* Double to DILLINGEN (but according to latest information has been reduced to single).
   - 25·3 (DILLINGEN—TRIER). Single.
   - 66·5 (OTZENHAUSEN—TURKISMÜHLE). Double.
4. *Maximum permissible axle load :* GERSTLINGEN—DILLINGEN. 16 metric tons.
   DILLINGEN—NONNWEILER—TRIER. 17 metric tons.
   NONNWEILER—TURKISMÜHLE. 17 metric tons.
5. *Gradients :* No information, but line follows river valleys, and is therefore fairly flat contour.
6. *Curvature :* No details available, but several sharp curves along PRIMS valley. Information about curves from 43·6 to 53·1 given in itinerary. From NONNWEILER to TRIER, line is very winding, following courses of rivers SARRER and RUWER almost all the way.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6.2 km (3⅞ miles) (DILLINGEN—NALBACH).
9. *Marshalling Yards (M.Y.) :* TRIER.
10. *Engine sheds :* DILLINGEN.
    HERMESKEIL.
    TRIER.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (a) Locomotive Depots referred to in para. 10.
    (b) Junctions at BUSENDORF—DILLINGEN—PRIMSWEILER and TURKISMÜHLE.
    (c) Bridges on route—the most important exist at 21·0 km. over SAAR, 25·3, 53·1 and 59·8 over R. PRIMS.
    (d) Tunnel at 5·2 km.
13. *Capacity :* Throughput capacity (as limited by single-track section), 20 trains per day of 300 tons net train load each.

Distance from FREISTROFF

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	FREISTROFF	—	SR. Wb. Cr.
			Bridge over road	Line runs N. for c. 2·2 km. then E. to Busendorf.
2½	4·0	BOUZONVILLE (BUSENDORF)	—	SER. Wb. Cr.
3	5·0		—	J (facing) left, with DT s.o. line to Beningen. Line runs North.
3⅜	5·2		Tunnel	c. 300 m. long.
4⅛	7·3	FILSTROFF	—	Passengers only.
4⅜	7·5		Road overbridge	—
7	11·2		Bridge over road	—
7	11·5	QUERSTLING	—	SR. Wb. Cr.
7⅜	11·7		—	Frontier.
7⅝	12·4		Road overbridge	
7⅞	12·7	NIKOLAITORF	—	Frontier station.
8⅝	14·1		Bridge over road	—
9⅛	14·9	HERMESKEIL	—	SR. Wb (40 t.). Cr (47 t.).
12	19·3	SIERSBURG	—	SR. Wb (30 t.). Cr (47 t.).
13	21·0		Bridge over main road	—
13⅛	21·7		Bridge over track	Flood opening.
13⅜	21·9		Bridge over Saar	c. 300 m.
13⅝	22·1		—	J (triangular) left, with DT s.o. line Trier—Saarbrücken (Route 56).

Distance from FREISTROFF *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
14	22·6		Bridge over track	Flood gap on North curve.
14	22·6		Bridge over track	Flood gap on South curve.
14	22·8		Bridge over road	Flood gap on South curve.
15	24·3	DILLINGEN	—	SER. Wb (30 t.). Cr (5 t.). ES. 15/20. Roundhouse. Turntable. W.
15½	25·3		Bridge over R. Prims (*c.* 200 m.)	J (facing) right, with DT s.o. line to Saarlouis (Route 36).
16	25·8		Bridge over road	Line turns N. along left bank of Prims—several sharp curves in river bends.
19	30·5	NALBACH	Bridge over road	ER.
21	33·9	KORPRICH	Bridge over road	Restricted goods facilities.
21½	35·2		Bridge over road	
22½	36·1		Bridge over tributary of Prims	—
22½	36·7		—	J (trailing) right, with DT line from Wemmetsweiler and Neunkirchen (this appears to have been reduced to single track).
23½	37·7	PRIMSWEILER	—	SR. Wb (30 t.).
23½	38·2		Bridge over road	—
25½	41·4	SCHMELZ	Road overbridge	SER. Wb (40 t.). Cr (5 t.).
27	43·6	MICHELBACH (SAAR)	—	—
27½	44·2		—	Curve *c.* 450 m. radius.
28	45·1		—	Curve *c.* 400 m. radius.
28½	46·1	LIMBACH	—	SER.
29	46·6		Bridge over stream	Curve *c.* 500 m. radius.
30½	49·2	BUSCHFELD	—	Wb (40 t.).
33	53·1		Bridge over R. Prims	Exchange facilities with light railway, from Menzig.
			—	Line curves sharply East radius *c.* 200 m.
33	53·4	WADERN	—	SER. Wb (40 t.). Cr (5 t.).
35½	56·7	KRETTNICH	—	Cr (5 t.).
37	59·8		Bridge over R. Prims	—
37½	60·1	PRIMSTAL	—	SR.
40	64·3	MARIAHUTTE	—	—
41½	66·5		—	J (triangular) left, with ST line to Nonnweiler—Hermeskeil—Trier.
41½	67·2	NONNWEILER	—	SER. Cr (5 t.).
47	75·9	HERMESKEIL	—	Wb (40 t.). SER. W. ES 20.
76½	123·8	RUWER	—	SR. Wb (40 t.). Cr (4 t.).
80	128·7	TRIER (MAIN STATION)	—	SER. Wb (40 t.). Cr (15 t.). Rpw. ES. W. M.P. see Route 51. Line to Trier is very winding and follows two river courses (Dürren and Ruwer) for practically its entire length.
41½	67·3		Bridge over main road	From J 66·5 the line turns E. as DT to Türkismühle.

Distance from FEISTROFF

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
42½	69·0	OTTERHAUSEN	Bridge over main road (Nonnweiler—Birkenfeld and Turkismühle)	SR.
43½	69·8		Bridge over main road (Nonnweiler—Birkenfeld and Turkismühle)	
43½	70·8	SCHWARZENBACH	—	Passenger halt.
44½	72·2		Bridge over main road (Nonnweiler—Birkenfeld and Turkismühle)	—
45	72·3		Bridge over main road to Birkenfeld.	—
45	72·6		Bridge over stream	—
46	74·0	SOTERN	—	SR. Wb (30 t.). Cr (5 t.).
46½	75·3		Bridge over main road to Turkismühle	—
47½	76·2	ECKELHAUSEN	—	Restricted goods facilities.
49	78·7		Bridge over main road Primstal—Turkismühle	—
49	79·0		—	J (trailing) right, with DT s.o. line from Neunkirchen (Route 59).
49½	79·5	TURKISMÜHLE	—	SER. Wb (40 t.).

ROUTE 97A

WEMMETSWEILER—LEBACH—PRIMSWEILER

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 23·2 km. (14½ miles).
3. *Track :* Laid double, but latest information indicates it has been reduced to single.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available, but negligible.
6. *Curvature :* No details available, but line follows a winding course along river valley.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·9 km. (3¾ miles) (LEBACH—PRIMSWEILER).
9. *Marshalling Yards (MY) :* None on route.
10. *Engine sheds (ES) :* None on route.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Junctions at WEMMETSWEILER, LEBACH and PRIMSWEILER.
    (b) Bridges on route.
13. *Capacity :* 20 trains per day each way, of 300 tons net train load each.

Distances from WEMMETSWEILER

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	WEMMETSWEILER	—	SER. Wb. (30 t.).
½	0·6		—	J (facing) right, with DT s.o. line from Saarbrücken—Neunkirchen (Route 63). Line follows course of R. Dirminger to Lebach and thence course of R. Theel, adopting a winding nature.
1	1·5		Road overbridge	—
2	3·1	ILLINGEN (SAAR)	—	Wb (30 t.). ER.
2½	4·3		Road overbridge	—
3½	6·1	WUSTWEILER	—	SR.
5½	8·8	DIRMINGEN	—	SER. Wb (20 t.). Cr (5 t.).
			Road overbridge	—
7½	11·6		Road overbridge	—
7½	12·6	EPPELBORN	—	SER.
8½	14·1	RUBACH	—	Restricted goods facilities.
9½	15·1		Road overbridge	—
10½	16·5		—	J (triangular) left, with ST s.o. line to Völklingen (Route 56A).
10½	17·3	LEBACH	—	SER. Wb. (30 t.). SY (small) left of line. Line joins course of Theel.
13½	22·2		—	J (trailing) left, with ST s.o. line from Dillingen (Route 57).
14½	23·2	PRIMSWEILER	—	SR. Wb (30 t.). Line continues ST to Nonnweiler (Route 57).

ROUTE 56

HARGARTEN—VÖLKLINGEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 19·8 kms. (12¼ miles).
3. *Track :* Originally double, except for connections at 15·4 and 18·2 kms., but latest information is that it has been reduced to single.
4. *Maximum permissible axle load :* 16 metric tons.
5. *Gradients :* No details available, but all low country and valleys of R. SAAR and tributary.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·8 kms. (3½ miles) (HARGARTEN—URBERHERRN).
9. *Marshalling Yards (MY) :* None on route.
10. *Engine Sheds (ES) :* VÖLKLINGEN.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (a) Junctions at HARGARTEN, WADGASSEN, HOSTENBACH and VÖLKLINGEN.
    (b) Engine shed at VÖLKLINGEN.
    (c) Bridges on route, the most important being those over the BIST at 10·8 km. and over the SAAR at 19·1 km.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each. Less if line is single.

Distance from HARGARTEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	HARGARTEN	—	SER. Wb Cr
½	0·5		—	J (facing) right and left, with DT s.o. line to Beningen.
			—	Line turns N.
¾	0·8		Flyover	Line passes under line referred to above.
¾	1·1		—	J (trailing) right, with DT s.o. line to Beningen.
2¾	4·6		Bridge over R. Bist	—
3½	5·8	URBERHERRN	—	Frontier station.
			—	SR. Wb (40 t.).
5	8·3	LINSLERHOF	—	SR.
6¾	10·8		Bridge over R. Bist	c. 200 m. long.
				Line runs along left bank of river.
7¾	11·6	DIFFERTEN	—	SR. Wb. (25 t.). Cr (5 t.).
8			Road overbridge	—
8¼	13·2	WERBELN	—	Passenger halt.
9¼	14·9	WADGASSEN	—	SR. Wb (25 t.). Cr (0 t.).
9½	15·4		Bridge over R. Bist	J (triangular) with ST connections to Bous.
9¾	15·8			
			—	Line turns E. along R. Saar.
10¼	16·9	HOSTENBACH	—	Restricted goods facilities.
11¼	18·2		—	J (facing) left, with DT line to Saarbrücken (Route 56A).
11¼	18·7		Flyover	Line passes over line to Saarbrücken.
11¾	19·1		Bridge over R. Saar	At least 100 m. long.
				J (trailing) left with DT s.o. line from Trier (Route 56).
12¼	19·8	VÖLKLINGEN	—	SER. Wb (60 t.). Cr (7·5 t.). ES (20) roundhouse.
				J for ST line to Lebach (Route 56B) and DT line to Saarbrücken (Route 56).

ROUTE 89

BENINGEN—FORBACH—SAARBRÜCKEN—NEUNKIRCHEN—KREUZNACH {BINGERBRÜCK / RÜDESHEIM

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 163·8 km. (102 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but line follows valleys of BLIES and NAHE, with mainly flat country in between. Highest contour line (400 m.) at ST. WENDEL (52·4 km.).
6. *Curvature :* No details available, but information about curves from 66·5 to 133·2 given in itinerary.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 7 km. (4⅜ miles) (STIRINGEN WENDEL—SAARBRÜCKEN).
   11 km. (6⅞ miles) (LAUBENHEIM—RÜDESHEIM).
9. *Marshalling Yards (MY) :* SAARBRÜCKEN.
   NEUNKIRCHEN (SCHLAVERIE).
   BINGERBRÜCK.
10. *Engine sheds (ES) :* KIRN 20.
    SAARBRÜCKEN (PBF.).
    SAARBRÜCKEN (PHF.).
    NEUNKIRCHEN.
    BINGERBRÜCK.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling Yards and Locomotive Depots referred to in paras. 9 and 10.
    (b) Main junctions at BENINGEN, ST. WENDEL, SAARBRÜCKEN, NEUNKIRCHEN, BAD-MÜNSTER, BAD-KREUZNACH, BINGERBRÜCK.
    (c) *Bridges on route :* The route is particularly vulnerable in this respect, owing to the many bridges over the SAAR, BLIES and NAHE.
    (d) Tunnels at 32·7, 40·8, 76·3, 76·7, 79·3, 81·4, 82·8, 84·8, 89·1, 89·4, 93·4, 124·7.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each.

Distance from BENINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
				Line continues direct route from Paris and Metz. Distance from Metz 70 km.
0	0	BENINGEN		SER. Wb. Cr.
			—	J for lines S. from Metz, W. from Luxembourg, and E. to Saargemünd, terminus for route 66 to Karlsruhe.
				Line runs N.
¼	1·0		—	J (facing) right, with DT s.o. line to Saargemünd.
1¼	2·7	KOCHERN	—	SR. Wb. Cr.
			Bridge over stream	—
2¼	3·5		Road overbridge	—
5	8·3	FORBACH	—	SER. Wb. Cr.
6	9·9	STIRINGEN WENDEL	—	SR. Wb.
7	11·5		—	Frontier.
8½	13·8		Flyover	Line passes under DT s.o. line from Wehrden and Saarlouis (Route 56A)
8¾	14·1			J (trailing) right, with DT s.o. line from Wehrden and Saarlouis.
8¾	14·2		Bridge over R. Saar	c. 200 m. long.
9¼	14·8		—	J (facing) left with DT s.o. line to Saarlouis and Trier (Route 56).

Distance from BENINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
9½	14·9		Bridge over railway	Line passes over loop line to MY.
9½	15·1		—	Line turns E. to Saarbrücken and runs parallel as 4-track with DT s.o. line from Trier (Route 56).
9⅝	15·2		—	J (facing) left, with DT s.o. line to Neunkirchen, via Schiffweiler.
9⅞	15·6		Flyover	Line passes under DT s.o. to Neunkirchen, via Schiffweiler.
10	16·1		—	J (trailing) left, with DT s.o. line to Neunkirchen, via Schiffweiler.
10	16·2		Bridge over railway	Line passes over loop line to MY.
10⅛	16·9	SAARBRÜCKEN	—	SER. Wb (40 t.). Cr (20 t.). 5 passenger platforms (4 island). *North of station*—Loco. depot and Rp S. *Loco. depot.* 2 ES (large). Rectangular and roundhouse. Tbl. W. RpS—locomotives.
10⅛	17·1		—	J (facing) right, with DT s.o. line to Saargemünd (Route 60).
10⅛	17·4		—	Line turns N.
			Flyover	Line passes under DT connection from MY to DT s.o. line to Saargemünd. MY—hump—*c.* 30. LS *for* marshalling and *c.* 20. LS *for* reception and departure. ES (large) rectangular—Tbl—W. For air photograph of layout at Saarbrücken, see Appendix 4.
			Road overbridge	—
12⅛	20·2	JAGERSFREUDE	—	Restricted goods facilities.
13⅜	22·2	DUDWEILER (207 m.)	—	SER. Wb (30 t.). Cr (5 t.).
16	25·7	ILSBACH	—	SER. Wb (30 t.). Cr (7·5 t.).
			Road overbridge	—
18	29·2	FRIEDRICHSTHAL (295 m.)	—	SER. Wb (30 t.).
19⅛	31·2	BILDSTOCK	—	Passenger station only.
			Short tunnel	*c.* 100 m. long.
19⅜	32·7		Short tunnel	*c.* 100 m. long.
20⅛	33·1	(280 m.)	—	—
21	33·8	LANDWEILER—REDEN	—	SER. Wb (40 t.).
21⅛	34·3	(260 m.)	—	Line turns Eastwards.
21⅞	35·0	SCHLAVERIE	—	MY, S. of line. Wb (40 t.).
22⅛	36·6			J (trailing) left with DT s.o. line from Saarbrücken, via Schiffweiler.

Distance from Beningen		Station	Engineering Works	Details and Facilities
Miles	Kms.			
23½	38·2	NEUNKIRCHEN		SER. Wb (40 t.). Cr (5 t.). 2 ES (large), rectangular and roundhouse. Thl. W.
			Bridge over R. Blies	
			—	] (facing) right, with DT s.o. line to Homburg (Route 63). Line turns N. and runs along valley of R. Blies.
24½	39·8		Bridge over R. Blies	—
25	40·3	WIEBELSKIRCHEN	—	Restricted goods facilities.
25½	40·8		Tunnel	c. 400 m. long.
			Bridge over R. Blies	—
			Tunnel	c. 200 m. long.
25½	41·3		Bridge over road	—
27½	43·9	OTTWEILER	Bridge over R. Blies	SER. Wb (41 t.).
27½	44·9		Bridge over R. Blies	—
30	48·5	NIEDERLINXWEILER	—	Passenger station only.
			Bridge over R. Blies	—
			Bridge over R. Blies	—
31	49·9		—	Passenger station only.
31½	50·4	OBERLINXWEILER	—	SER. Wb (40 t.). Cr (5 t.). Rp S (locomotives): total staff 618.
32½	52·4	ST. WENDEL		] (facing) left, with DE ST s.o. line to Tholey. Line leaves course of R. Blies.
34½	55·5	BALTERSWEILER	—	Restricted goods facilities.
35½	57·0		Road overbridge	—
36	57·9	HOFELD	—	Restricted goods facilities
36	58·2		Bridge over road	—
37½	60·0	NAMBORN	—	Restricted goods facilities.
40	64·3	WALHAUSEN	—	Restricted goods facilities.
41½	66·5		—	] (trailing) left, with DT s.o. line from Nonnweiler. Line curves round river bend, radius c. 600 m., and follows course of Nahe to Bingerbrück.
41½	67·0	TURKISMÜHLE	—	SER. Wb (40 t.).
			Bridge over arterial road	—
43	69·2	NOHFELDEN NORD	—	Restricted goods facilities.
			Bridge over R. Nahe	—
43½	69·9		Bridge over R. Nahe	—
45½	73·1	NEUBRÜCKE (NAHE)	—	SR. Wb (40 t.). Cr (4 t.). Terminus for ST s.o. line to Birkenfeld c. 415 km.
			—	
46½	75·0	HOPPSTADTEN	Bridge over road	SER.
47½	76·3		Tunnel	c. 350 m. long
47½	76·7		Tunnel	c. 400 m. long.
			—	] (trailing) right, with ST s.o. DE line from Baumholder.
48½	78·0	HEIMBACH	—	SER Wb (35 t.).
48½	78·5		Bridge over R. Nahe	—
49	79·1		Bridge over R. Nahe	—
49½	79·3		Tunnel	c. 200 m. long.
49½	79·6		Bridge over R. Nahe	—

Distance from Beningen				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
50¼	81·0	NOHEN	—	Restricted goods facilities.
50½	81·4		Tunnel	*c.* 150 m. long.
51¼	82·8		Tunnel	*c.* 200 m. long.
51½	83·0		Bridge over R. Nahe	—
51¾	83·5	KRONWEILER	—	SER. Wb (40 t.). Cr (2·5 t.).
52	83·9		Bridge over R. Nahe	—
52¼	84·7		Bridge over R. Nahe	—
52½	84·8		Tunnel	*c.* 350 m. long.
53	85·3	SONNENBURG	—	Restricted goods facilities.
53	85·5		Bridge over R. Nahe	—
54¾	88·3		2 bridges over R. Nahe	—
55	88·7	ENZWEILER	—	—
55¼	89·1		Tunnel	*c.* 450 m. long.
			Bridge over river (Sies)	—
55½	89·4		Tunnel	*c.* 400 m. long.
56¼	90·9	IDAR—OBERSTEIN	—	SER. Wb. (40 t.).
58	93·4		Bridge over R. Nahe	—
			Tunnel	*c.* 250 m. long.
58¼	93·7		Bridge over R. Nahe	—
58¾	94·6		Bridge over tributary of R. Nahe	—
59	95·0	NAHBOLLENBACH	—	Restricted goods facilities.
61	98·3	FISCHBACH—WEIERBACH	—	SER. Wb (40 t.).
62	100·0		Bridge over R. Nahe	Line follows L. bank of Nahe.
63¼	102·3	KIRN—SILEBACH	—	Restricted goods facilities.
65¼	105·3		Bridge over tributary of R. Nahe	—
65¾	105·8	KIRN	—	SER. Wb (40 t.). Cr (4 t.). ES (small). W.
66¼	107·2		Bridge over road	Line turns E.
66¾	107·6		Bridge over road	—
68	109·7	HOCHSTETTIN	—	Restricted goods facilities.
68¾	110·7		Bridge over tributary of R. Nahe	—
69¼	111·7	MARTINSTEIN	—	—
71¾	115·7		Bridge over tributary of R. Nahe	—
72	116·0	MONZINGEN	—	SER. Wb (35 t.).
74¼	119·6		Bridge over road	—
74¼	120·0	SOBERNHEIM	—	SER. Wb (40 t.). Cr (5 t.).
76¼	123·1		Road overbridge	—
76½	123·4	STAUDERNHEIM	—	SER. Wb (40 t.). Cr (5 t.). J (facing) right, with loop connection to DT s.o. line Saarbrücken — Rüdesheim (Route 60).
77¼	124·7		Tunnel	*c.* 400 m. long.
				Line turns N. curve *c.* 400 m. radius.
			Bridge over tributary of R. Nahe	—
79¾	127·5	WALDBÖCKELHEIM	—	SER. Cr (5 t.).
81¼	130·8		—	Curve radius *c.* 400 m. in river bend.
82¼	132·8	NIEDERHAUSEN BEI MÜNSTER A/STEIN	—	—
82¾	133·2		Road overbridge	—
			—	Curve radius *c.* 600 m. round river bend.

Distance from BENINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
84	135·4	NORHEIM	—	Restricted goods facilities.
85⅛	138·2		—	J (trailing) right with DT s.o. line from Homburg (Route 60).
86	138·6	BAD-MÜNSTER A/STEIN		SER. Cr (5 t.).
86¼	139·1		Bridge over R. Nahe	c. 150 m. long. Line continues along right bank of river.
88¼	142·6	BAD-KREUZNACH	—	SER. Passenger station with restricted goods facilities. J (facing) right, with DT s.o. line to Mainz and Wiesbaden (Route 60).
89⅞	144·6		—	J (facing) right with private siding to gas works.
			Bridge over R. Nahe	c. 200 m. long.
91⅛	147·3	BRETZENHEIM (NAHE)	—	Restricted goods facilities.
91⅞	147·7		Bridge over road	—
93	149·7		—	J (trailing) left, with ST s.o. line from Simmern, Boppard and Hermeskeil.
93⅛	150·8	LANGENLONSHEIM	—	SER. Wb (35 t.). Cr (3 t.).
95	152·8	LAUBENHEIM (NAHE)	—	Halt.
95⅛	154·3		—	J (facing) right, with DT s.o. line to Rüdesheim 9·5 km. (see below).
97	156·1	MÜNSTER—SARMSHEIM	—	Restricted goods facilities. J (triangular) with DT s.o. line from Mainz and Frankfurt (Route 54).
98⅛	158·8	BINGERBRÜCK	—	SER. Wb (60 t.). Cr (5 t.). MY, capacity 2,000 wagons per day. ES (small), roundhouse. Tbl. W. Line continues DT to Koblenz and Köln as Route 54.
95	152·8	LAUBENHEIM	—	Restricted goods facilities.
95⅛	154·3		—	J (facing) left, with DT s.o. line to Bingerbrück.
96⅛	155·1		Bridge over R. Nahe	c. 300 m. long.
96⅞	155·8		Bridge over road	—
97	156·4		Road overbridge	—
98⅛	158·2		Road overbridge	—
98⅛	158·2		—	J. (trailing) right, with DT s.o. line to Mainz and Wiesbaden (Route 60).
99⅛	159·8		Hindenburg Bridge over railway and R. Rhine	Line crosses DT s.o. line Koblenz—Frankfurt (Route 54), also R. Rhine. Total length 1,075·3 m. Prepared for demolition and no decking on floor of bridge for troops (see diagram in Appendix 20)
99⅞	160·7		—	J (triangular), with DT s.o. line from Frankfurt to Koblenz (Route 53).
102	163·8	RÜDESHEIM	—	SER. Wb (40 t.). Cr (3 t.). Junction for lines E. to Frankfurt and Wiesbaden and N. to Koblenz. Line continues to Koblenz as Route 53.

ROUTE 60

SAARGEMÜND—SAARBRÜCKEN—HOMBURG (SAAR)—KAISERSLAUTERN—BAD-MÜNSTER—MAINZ—WIESBADEN—FRANKFURT

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 220·5 km. (137 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but line mainly runs through flat country and valley of R. Alsenz.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 10·5 km. (6½ miles). (Hochspeyer—Kaiserslautern).
9. *Marshalling Yards (MY) :* Frankfurt (Main), Mainz, Homburg, Kaiserslautern, Saarbrücken.
10. *Engine Sheds (ES) :* Frankfurt (Main), Kaiserslautern, Mainz, Wiesbaden, Homburg, Saarbrücken.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (*a*) Marshalling Yards and Engine Sheds referred to in paras. 9 and 10.
    (*b*) Main junctions at Saargemünd, Saarbrücken, Homburg, Kaiserslautern, Langmeil, Bad-Münster, Kreuznach, Ockenheim, Mainz and Frankfurt.
    (*c*) Bridges on route—the most important are those at 0·9 km. over R. Saar, 139·3 and 140·5 km. over R. Nahe, and those in the Mainz and Frankfurt area over R. Rhine and R. Main (for details see Route 54).
    (*d*) Tunnels at 83·5, 93·2, 111·5 and 127·7 km.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each.

Distance from Saargemünd				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	Saargemünd		Frontier. SER. Wb. Cr.
½	0·9		Bridge over R. Saar	J (facing) left, DT s.o. line to Beningen (junction for Route 59). Line proceeds along right bank of Saar.
1	1·9	Hanweiler—Bad-Rilching	—	SER. Wb (40 t.).
2½	3·8	Aurbsmacher	—	Restricted goods facilities.
3½	5·7	Kleinblittersdorf	Road overbridge	SER. Wb (30 t.). Cr (5 t.).
5½	8	Bubingen	—	Restricted goods facilities.
7	11·4	Gudingen	—	Restricted goods facilities.
		Saarbrücken–Osthafen–Grozmarkt	—	Goods station. —
8	13·1		Bridge over tributary of R. Saar	—
8½	13·4	Brebach	—	SER. Wb (60 t.). Cr (10 t.).
8¾	14·3		—	J (triangular) left, with DT s.o. line connection to Saarbrücken (distance 3·6 km).
		Saarbrücken	—	Passenger station; for description, see Route 59. MY. SER. Wb (40 t.). Cr (40 t.). For description, see Route 59. Line turns E.
10½	16·9	Bischmisheim	—	Restricted goods facilities.
11¾	18·9	Scheidt	—	SER. Wb (30 t.). Cr (10 t.).
13	20·9		Bridge over tributary of R. Saar.	...
13½	21·4	Rentrisch	—	Restricted goods facilities.

Distance from SAARGEMÜND *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
15	24·4	ST. INGBERT	—	SER. Wb (40 t.). Cr (4 t.).
15¾	25·5		Bridge over road	Line turns N.E.
16¼	26·2		—	J (facing) right, with ST s.o. line to Bierbach (Route 66).
17¾	27·9	ROHRBACH	—	Wb (35 t.). Cr (4 t.).
19¾	30·9		Road overbridge	—
20¾	33·4	KIRKEL	—	SER. Wb (35 t.). Cr (5 t.).
23¾	38·2	LIMBACH	—	SER. Wb (35 t.). Cr (5 t.). J (triangular) left to MY. Wb (40 t.). SER. ES (medium) roundhouse.
25	40·3	HOMBURG W. (SAAR)	—	Restricted goods facilities.
25¾	41·5		Bridge over railway	Line crosses DT connection from MY. ES (medium), roundhouse. Tbl. W. J (trailing) left, with DT s.o. line from :—
26	41·8			(1) MY.
26¼	42·2			(2) Neunkirchen. (3) Neunkirchen.
26¾	43·0	HOMBURG (SAAR)	Bridge over road	Main station. SER. Wb (40 t.). ES. (35/40) roundhouse. Tbl. MY.
27	43·5		—	J (facing) right, with DT s.o. line to Bad-Münster, via Lauterecken.
27¼	44·0		—	J (facing) left, with DT line to Lauterecken.
27¾	44·5		Bridge over railway	Line passes over connection to above line.
29¾	48·0	EICHELSCHEID	—	SR. Wb (35 t.). Line runs through flat country.
33	53·3	BRUCHMÜHLBACH	Bridge over road	SER. Wb (40 t.).
34	55·0		Bridge over stream	—
35¾	57·5	HAUPSTUHL	Bridge over road	SER. Wb (40 t.). Cr (1 t.). J (trailing) left, with ST line to Glan-Munchweiler.
39¼	63·2	LANDSTUHL	—	SER. Wb (35 t.). Cr (1·5 t.).
41¼	66·7	KINDSBACH	Bridge over road	SR. Wb (40 t.).
43¼	70·5	EINSIEDLERHOF	Bridge over road	SER. Wb (80 t.). Cr (5 t.).
46	74·2		—	J (facing) right, to Rp S.
47	75·7	KENNELGARTEN	—	Passenger halt for Rp S. J (trailing) from Rp S (Kaiserslautern) locomotives and goods rolling stock—personnel employed 1,227.
47¼	76·7		—	J (trailing) left, with ST s.o. line from Lauterecken.
47¾	77·0		—	J (trailing) right, with ST s.o. line from Biebermühle (on Route 66).

Distance from SAARGEMÜND

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
48¾	78·4	KAISERSLAUTERN	—	SER. Wb (40 t.). Cr (6 t.). Rp S—locos. and goods wagons; total staff 1,227. ES. W. MY—capacity 3,500 wagons per 24 hours.
49	79·0		—	J (facing) left, with ST s.o. loop line to Enkenbach (13·2 km.).
50¼	81·1		Bridge over stream	—
51¼	83·5		Tunnel	c. 1·3 km.
55¼	88·9	HOCHSPEYER	—	SR. Wb (35 t.).
			Bridge over stream	
				J (triangular) right, with DT s.o. line to Neustadt.
				Line turns N.
58	93·2		Tunnel	c. 700 m.
58¼	94·2		—	J (trailing) left, with ST s.o. loop line from Kaiserslautern.
59	94·9	ENKENBACH	—	SER. Wb (40 t.).
				Line follows course of R. Alsenz.
60	96·4		Bridge over R. Alsenz	—
60¼	97·1		Bridge over R. Alsenz	—
61	98·2		Bridge over tributary	—
62	100·0	NEUHEMSBACH	—	SR. Wb (40 t.).
			Bridge over tributary	—
64¼	104·1	LANGMEIL		SER. Wb. (40 t.).
65	104·8		—	J (facing) right, with DT s.o. line to Worms and Frankfurt.
65¼	106·9	WINNWEILER	—	SER. Wb (40 t.).
66¼	107·6		Bridge over river	—
67¼	108·8		Bridge over river	—
69¼	111·5		Tunnel	c. 500 m. long.
69¾	112·1	IMSWEILER	—	SR. Wb (25 t.).
70¾	114·1		Bridge over river	—
72	116·-	ROCHENHAUSEN	—	SER. Wb (35 t.).
73¼	116·0		Bridge over stream and road	—
74¼	120·3	DIELKIRCHEN	Bridge over road	Wb (40 t.). Cr (4·4 t.).
75¼	121·9		Bridge over stream	—
76¼	123·1	BAYERFELD-KÖLLN	Bridge over road	SER. Wb (35 t.).
			Bridge over stream	—
77¼	124·5	MANNWEILER	—	SR. Wb (40 t.).
78¼	126·7		Bridge over R. Alsenz	—
79¼	127·7		Tunnel	c. 400 m. long.
79¾	127·3	ALSENZ	—	SER. Wb (40 t.) Cr (5 t.).
82¼	132·7	HOCHSTATTEN	Road overbridge	Wb (40 t.).
			Bridge over R. Alsenz	—
82¾	133·2		Bridge over R. Alsenz	—
83	133·7		Bridge over R. Alsenz	—
84¼	135·7		Bridge over R. Alsenz	—
84¾	136·6	ALTENHAMMERG	—	Restricted goods facilities.
	137·1		Bridge over R. Alsenz	—
85¼	137·6		Bridge over R. Alsenz	—

Distance from SAARGEMÜND		*Station*	*Engineering Works*	*Details and Facilities*
Miles	*Kms.*			
86¼	139·1	EBERNBURG	—	SER.
86¼	139·3		Bridge over R. Nahe	c. 100 m. long.
86¾	139·7		—	↓ (trailing) left, with DT s.o. line from Saarbrücken, via Neunkirchen (Route 59).
87	140·0	BAD-MÜNSTER	—	SER. Cr (5 t.). Line continues as Route 59 to Kreuznach.
87½	140·5		Bridge over R. Nahe	—
89¼	144·0	BAD-KREUZNACH	—	SER. Restricted goods facilities.
90¾	146·0		—	↓ (facing) left, line branches away from DT s.o. line to Bingerbrück (Route 59).
91	146·4		Road overbridge	—
92½	148·7	PLANIG	—	SER. Cr (2 t.).
			Bridge over road	—
94	151·3		Bridge over R. Wies	—
94¼	151·7		—	↓ (trailing) right, with ST s.o. line from Alzey (19·9 km.), ES.
			Bridge over main road	
94¼	152·4	GENSINGEN-HORRWEILER	—	SER. Cr (2 t.).
95¼	153·7		Bridge over main road	—
97½	156·5	BUDENHEIM-DROMERSHEIM	—	SER. Cr. (2 t.).
			Bridge over main road	—
97¾	157·5			↓ (facing) right, with DT s.o. line to Bingen (c. 6·5 km.).
98¾	158·8		Bridge over railway	Line crosses above DT line. ↓ (trailing) left, with DT connection from line to Rüdesheim (Route 59).
99¼	160·0	OCKENHEIM		ER. Cr (2 t.).
101	162·8		—	↓ (trailing) left, with DT s.o. line from Bingen (Route 54).
101¾	163·8	GAU-[illegible]GESHEIM	—	SER. Wb (40 t.). Cr (2 t.). Line continues to Frankfurt.
115	185·0	MAINZ (MAIN STATION)	—	For details of route, see Route 54.
118	190·0	WIESBADEN		
137	220·5	FRANKFURT (MAIN STATION)		

ROUTE 61

ROHRBACH—BIERBACH—EINÖD—ZWEIBRÜCKEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 19·7 km. (12¼ miles).
3. *Track :* Single from Rohrbach to Bierbach ; double from Bierbach to Zweibrücken.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available, but negligible.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5 k.s. (3 miles) (WÜRZBACH—LAUTZKIRCHEN).
9. *Marshalling yards (MY) :* ZWEIBRÜCKEN.
10. *Engine Sheds (ES) :* ZWEIBRÜCKEN.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (*a*) Engine Sheds, Marshalling Yard and Junction at ZWEIBRÜCKEN.
    (*b*) Junctions at 1·0, 10·9 and 15·0 kms.
13. *Capacity :* 20 trains per day each way of 300/400 tons net train load each (throughout capacity).

Distance from ROHRBACH *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	ROHRBACH (SAAR)	—	Wb (35 t.). Cr (4 t.).
½	1·0		—	J (facing) left, with DT s.o. line to Homburg (Route 60). Line turns South.
1½	2·2	HASSEL (SAAR)	—	SER.
2½	3·9		Bridge over river	—
3½	5·2	WÜRZBACH (SAAR)	Road overbridge	Wb (40 t.).
3¾	6·2		Bridge over river	—
5¾	9·2		Bridge over road and river	—
6½	10·2	LAUTZKIRCHEN	—	SER. Wb (35 t.).
6¾	10·9		—	J (trailing) right, with DT s.o. line from Saargemünd (Route 66).
8	12·8	BIERBACH	—	SR. Wb (40 t.). Line continues DT to Einöd and Zweibrücken as Route 66. See description of line for that route.
9½	15·0		—	J (triangular) left, with DT s.o. line to Homburg (Route 62).
10	16·2	EINÖD	—	—
12½	19·7	ZWEIBRÜCKEN	—	SER. Wb (80 t.). Cr (8 t.). ES. W. MY. (For description, see Route 66.)

ROUTE 62

BIERBACH—HOMBURG—BAD-MÜNSTER

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 93·4 km. (58 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :*
   BIERBACH—HOMBURG, 18 metric tons.
   HOMBURG—ALTENGLAN, 17 metric tons.
   ALTENGLAN—LAUTERECKEN, 20 metric tons.
   LAUTERECKEN—BAD-MÜNSTER, 17 metric tons.
5. *Gradients :* No details available, but heavy gradients may be expected.
6. *Curvature :* No details available, but the line follows the winding course of the R. GLAN and has many curves.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9·3 km. (5¾ miles).
9. *Marshalling Yards (MY) :* HOMBURG.
10. *Engine Sheds (ES) :* HOMBURG.
11. *Watering facilities :* HOMBURG.
12. *Vulnerable points :*
   (*a*) Engine Shed and Marshalling Yard at HOMBURG.
   (*b*) Main junctions at HOMBURG and BAD-MÜNSTER.
   (*c*) Bridges on route—the most important is that over the NAHE at 92·8 km. In addition, several bridges cross the R. GLAN.
   (*d*) Tunnels at 24·3, 28·8 and 82·81 km.
13. *Capacity :* 60 trains per day each way, of 400 tons net train load each.

Distance from BIERBACH

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	BIERBACH	—	SR. Wb (40 t.).
2	3·4	SCHWARZENACKER	Road overbridge	—
3¾	6·2	HOMBURG (SAAR)—BEEDEN	—	Passenger Halt.
4¼	7·2		—	J (facing) left to MY.
4¾	7·7		Bridge over main road	—
5	7·9		—	J (trailing) left from Homburg W. and Neunkirchen (Routes 60 and 63).
5¼	9·1	HOMBURG	—	*Main station.*
				SER. Wb (40 t.).
				MY. West of line.
				ES (small) roundhouse.
				W. Tbl.
6	9·6		—	J (facing) left, with DT s.o. line to Kaiserslautern.
6¼	10·6		Flyover	Loop to Bad-Münster passes over Kaiserslautern line.
6¾	10·3		—	J (facing) right with DT s.o. line to Kaiserslautern (Route 60).
				Line bears N.
7¼	12·3		Bridge over road	—
9¼	15·3	WALDMOHR-JÄGERSBURG	—	SER. Wb (35 t.). Cr (5 t.).
10¼	16·8		Bridge over river	—
11¾	19·1		Bridge over road	—
12¼	19·6	SCHÖNENBERG—KÜBELBERG	—	SER. Wb (40 t.).
13	20·8		Bridge over stream (Köhl)	—
13¼	21·8		Bridge over main road	—
14	22·8	ELSCHBACH	—	Restricted goods facilities.
15	24·3		Tunnel	c. 450 m.

Distance from BIERBACH *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
16½	26·1	DIETSCHWEILER	—	SR. Wb (35 t.).
16½	26·9		Bridge over road	—
17	27·5		Bridge over road	—
17½	28·8		Tunnel	*c.* 450 m.
			—	J. (trailing) right, with ST line from Landstuhl.
18½	29·3	GLAN—MÜNCHWEILER	Bridge over road	SER. Wb (35 t.).
18½	30·1		Bridge over river (Glan)	—
19	30·6		Bridge over river (Glan)	—
			—	Line runs N. along course of R. Glan.
19½	31·2	**RENWEILER**		SER.
20½	32·9	EISENBACH—MATZENBACH		SR.
22½	35·9	THEISBERGSTEGEN	—	Wb (40 t.).
24½	39·0		Road overbridge	—
24½	39·4	ALTENGLAN	—	SER. Wb (40 t.).
			—	J (facing), with ST DE line to Kusel (projected extension to Türkismühle (Route 59)).
25	40·1		Bridge over R. Glan	—
25	40·3		Bridge over road	—
26	41·8	BEDESBACH—PATERSBACH	Bridge over road	SR. Wb (35 t.).
26½	42·7		Bridge over R. Glan	—
26½	43·2		Road overbridge	—
27	43·4	ULMET		SR. Wb (35 t.).
27½	43·8		Bridge over R. Glan	—
27½	44·0		Road overbridge	—
27½	44·5		Bridge over R. Glan	—
27½	44·7		Short tunnel	—
28½	46·4	NIEDERALBEN—RATHSWEILER	—	SR. Wb (35 t.).
29	46·8		Bridge over R. Glan	—
29½	47·4		Bridge over R. Glan	—
29½	48·0	ESCHENAU	—	Restricted goods facilities.
30½	49·2		Bridge over road	—
			—	Line continues along left bank of R. Glan.
30½	49·7	ST. JULIAN	—	SER. Wb (35 t.).
31½	50·3		Bridge over road	—
32½	51·8	NIEDEREISENBACH—HACHENBACH		SR. Wb (40 t.).
33	53·4		Bridge over road	—
33½	53·9		Bridge over road	—
33½	54·4	OFFENBACH—HUNDHEIM	—	SER. Wb (33 t.).
35	56·5	WIRSWEILER	—	SR.
37½	57·0		Bridge over road	—
36½	58·4		—	J (trailing) right, with ST s.o. line from Kaiserslautern.
36½	58·9	LAUTERECKEN—GRUMBACH	Bridge over road	SER. Wb (40 t.).
38	61·0	MEDARD	—	SR. Wb (35 t.).
38½	61·7		Bridge over road	—
40½	65·0	ODERNBACH	—	SR. Wb (30 t.).
			Road overbridge	—

Distance from BIRKENFELD				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
42½	68·8	MEISENHEIM (GLAN)	—	SER. Wb (40 t.).
			Road overbridge	
43½	70·5	RAUMBACH	—	Passenger station only.
45½	73·1	RENBORN		SR. Wb (35 t.).
47½	77·0	ODERNHEIM (GLAN)	—	SER. Wb (20 t.).
48	77·5		Road overbridge	J (facing) left, with ST loop connection to Staudernheim (Route 59).
48½	77·8		Bridge over river	—
48½	79·3		—	Line now runs along right bank of R. Nahe.
51½	82·8		Tunnel	*c.* 400 m. long.
52½	84·1	DUCHROTH	—	SER. Wb (40 t.).
52½	84·6		Bridge over road	—
57½	92·8		Bridge over R. Nahe	At least 250 m. long.
58	93·2		—	J (trailing) left, with DT s.o. line from Neunkirchen (Route 59). J (trailing) right, with DT s.o. line from Kaiserslautern (Route 60).
58	93·4	BAD-MÜNSTER		SER. Cr (5 t.). Route 59 to Bingerbrück and Rüdesheim. Route 60 to Mainz, Wiesbaden and Frankfurt.

ROUTE 68

SAARBRÜCKEN (MAIN STATION)—SCHIFFWEILER—NEUNKIRCHEN—HOMBURG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 38·8 km. (24 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 18 metric tons (SAARBRÜCKEN—NEUNKIRCHEN).
   20 metric tons (NEUNKIRCHEN—HOMBURG).
5. *Gradients :* No information available.
6. *Curvature :* No information available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·9 kms. (3¾ miles).
9. *Marshalling yards (MY) :* SAARBRÜCKEN, NEUNKIRCHEN—SCHLAVERIE, HOMBURG.
10. *Engine sheds (ES) :* SAARBRÜCKEN, NEUNKIRCHEN—SCHLAVERIE, HOMBURG.
11. *Watering facilities :* SAARBRÜCKEN, NEUNKIRCHEN—SCHLAVERIE, HOMBURG.
12. *Vulnerable points :* MY's, ES's mentioned in paras. 9 and 10.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distance from SAARBRÜCKEN Miles	Kms.	*Station*	*Engineering Works*	*Details and Facilities*
0	0	SAARBRÜCKEN	—	Main station. 5 passenger platforms (4 island).
				Goods Station.
				SER. Wb (40 t.). Cr (20 t.).
				Loco. Depot.
				2 ES (large) rectangular and roundhouse.
				Tbl. W.
				Rp S (locomotives).
				MY (hump), *c.* 50 LS. ES (large) rectangular. W. Tbl.
				(For air photograph of Saarbrücken, see Appendix 4.)
				Line runs West to
¼	0·8		—	J (facing) left, with DT s.o. line from Beningen (Route 59) and Trier (Route 56).
				Line turns N.
¾	1·4		—	J (trailing) left, with flyover connection from DT s.o. line from Beningen (Route 59).
1	1·6	SAARBRÜCKEN—SCHLEIFMÜHLE	—	SY. (*c.* 10 LS).
			—	Wb (40 t.). Cr (5 t.). SER.
1¼	2·1		Road overbridge	Line follows course of R. Fisch.
2¼	3·7		Bridge over road	—
2¾	3·9		Bridge over R. Fisch	—
3¾	5·2	NEUHAS (SAAR)	—	Restricted goods facilities.
5¼	8·4		Bridge over road	—
5¾	8·7	FISCHBACH—CAMPHAUSEN	—	ER. Cr (5 t.).
6¾	11·1	BREFELD	—	—
7¼	11·6		Bridge over road	—
7¾	12·5		Bridge over road	—
7¾	12·6	QUIERSCHIED	—	SER. Cr (5 t.).
10	16·0		Road overbridge	—
10¼	16·4	MERCHWEILER	—	SER.
10¼	16·5		Tunnel	*c.* 750 m. long.
10¾	17·0		—	J (trailing) left, with DT s.o. line to Lebach (Route 57A).

Distances from SAARBRÜCKEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
11¼	18·2	WEMMETSWEILER	—	SER. Wb (30 t.).
11½	18·8		Road overbridge	Line turns East.
12	19·4		Bridge over road	—
13½	22·3	SCHIFFWEILER	—	SER. Wb (30 t.).
14½	23·0	NEUNKIRCHEN (SCHLAVERIE)	—	J (facing) right, with loop connection to Schlaverie. MY. Wb (40 t.). ES. W. Tbl.
15½	25·3		—	J (trailing) right, with DT s.o. line from Saarbrücken to Neunkirchen (main station) Route 59.
16	25·8		—	J (facing) with DT s.o. line to Neunkirchen (main station) and Bingerbrück (Route 59).
			Bridge over R. Blies	
17½	28·2		Bridge over main road	—
18	28·9	NEUNKIRCHEN—WELLESWEILER	Bridge over main road	Restricted goods facilities
18½	30·2		Bridge over light railway	—
19½	30·9		—	J (trailing) left, with private siding to mines.
19½	31·3	HOCHBERG	Bridge over road	SER. Wb (35 t.).
21½	34·7	ALSTADT (SAAR)	Bridge over road	Restricted goods facilities.
22½	36·2		—	J (facing) right, with loop connection to MY.
23½	37·5		—	J (trailing) with DT line from Saarbrücken, via St. Ingbert (Route 60).
24	38·8	HOMBURG (SAAR)	—	SER. Wb (40 t.). MY. ES (medium) roundhouse. Tbl. W.

ROUTE 64

KAISERSLAUTERN—LAUTERECKEN-GROMBACH

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 35·4 km. (22 miles).
3. *Track :* Single.
4. *Maximum permissible axle load :* 17 metric tons.
5. *Gradients :* No information available, but as the line follows the valley of the LAUTER, it is improbable that severe gradients will be encountered.
6. *Curvature :* No information available, but sharp curves will be consistent throughout the whole route—details shown in itinerary are taken from 1/100,000 map.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 4 km. (2½ miles).
9. *Marshalling Yards (MY) :* KAISERSLAUTERN.
10. *Engine Sheds (ES) :* KAISERSLAUTERN.
11. *Watering facilities :* KAISERSLAUTERN.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities at KAISERSLAUTERN.
    (b) Main junctions at KAISERSLAUTERN and LAUTERECKEN.
    (c) Bridges over R. LAUTER and R. GLAN at 14·2, 18·6 and 34·9 km.
    (d) Tunnel at 25·8 km.
13. *Capacity :* 24 trains per day each way, of 300/350 tons net train load each.

Distance from KAISERSLAUTERN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KAISERSLAUTERN	—	*Main Station.* SER. Wb (40 t.). Cr (6 t.). ES. W. Tbl. Rp S locos. and goods rolling stock. *MY*—capacity 3,500 per 24 hours. Line runs W to J.
1	1·8		—	J (facing) left, with DT s.o. line to Homburg (Route 60). Line runs N. as ST along course of R. Lauter.
1½	2·3		Road overbridge	—
2½	3·8	KAISERSLAUTERN (W)	—	SR. Wb (40 t.).
2¾	4·6		Bridge over river	—
4¾	7·8	LAMPERTSMÜHLE—OTTERBACH	—	SER. Wb (35 t.).
5	8·3		—	J (facing) left with DE ST line to Reichenbach—length of line 16·4 km.
7¾	11·5	KATZWEILER	—	SR. Wb (40 t.).
8½	13·9	HIRSCHHORN	—	Wb (40 t.).
8¾	14·2		Bridge over R. Lauter	—
9¾	15·9	UNTERSULZBACH	—	Passenger traffic only.
11	17·9	OLSBRUCHEN	—	SR. Wb (40 t.).
11¼	18·4		Road overbridge	—
11½	18·6		Bridge over R. Lauter	—
12½	20·2	KAULBACH	—	Passenger traffic only.
			—	Sharp curve round river bend—radius *c.* 300 m.
13¾	21·3	KREIMBACH	—	SER. Wb (40 t.).
14½	23·5	ROSSBACH	—	Passenger halt.
15¾	25·5	WOLFSTEIN	—	SR. Wb (40 t.).
16	25·8		Tunnel	*c.* 150 m. long.
16¼	26·2		Bridge over river	—
17¼	28·5	RECKWEILERHOF	—	SR. Wb (30 t.).
19¼	31·2		Bridge over road	—
19½	31·6	HEINZENHAUSEN	—	Wb (25 t.).
20½	33·1	LOHNWEILER	—	Passenger traffic only.
21¼	34·9		Bridge over R. Glan	—
			—	J (trailing) left, with DT s.o. line Homburg – Bad-Münster (Route 62).
22	35·4	LAUTERECKEN-GROMBACH	—	SER. Wb (40 t.).

ROUTE 68

KAISERSLAUTERN—NEUSTADT—LUDWIGSHAFEN—MANNHEIM

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 70·6 km. (43¾ miles). (KAISERSLAUTERN—MANNHEIM—FRIEDRICHSFELD.)
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but the most severe will probably be encountered between KAISERSLAUTERN and NEUSTADT.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9 km. (5½ miles).
9. *Marshalling Yards (MY) :* KAISERSLAUTERN, LUDWIGSHAFEN, MANNHEIM.
10. *Engine Sheds (ES) :* KAISERSLAUTERN, NEUSTADT, LUDWIGSHAFEN, MANNHEIM.
11. *Watering facilities :* KAISERSLAUTERN, NEUSTADT, LUDWIGSHAFEN, MANNHEIM.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities referred to in paras. 9 and 10.
    (b) Main junctions at KAISERSLAUTERN, NEUSTADT, SCHIFFERSTADT, LUDWIGSHAFEN and MANNHEIM.
    (c) Bridges on route—the most important is that at 61·4 km. over the R. RHINE.
    (d) Tunnels at 6·7, 15·1, 16·7, 17·9, 19·1 and 29·0 km.
13. *Capacity :* 72 trains per day each way, of 450/500 tons net train load each.

Distance from KAISERSLAUTERN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KAISERSLAUTERN	—	(*Main Station.*) ES. W. Tbl. Rp S (loco. and goods rolling stock). Total staff 1,227.
1	1·7		—	J (facing) left, with DT s.o. line to Bad-Münster (Route 60).
2½	4·5		Bridge over stream	
4	6·7		Hethgenberg tunnel	*c.* 1·3 km. long.
5½	8·7	ALTOCHSPEYER	—	SER. Wb (35 t.).
6	9·5	HOCHSPEYER	—	SR. Wb (35 t.).
9	14·5	FRANKENSTEIN	—	SER. Wb (35 t.) Cr (6 t.).
9¼	15·0		Bridge over R. Speyer	—
9¼	15·1		Tunnel	*c.* 450 m. long.
9½	15		Bridge over road	—
10¼	16·7		Tunnel	*c.* 450 m. long.
11	17·9		Tunnel	*c.* 550 m. long.
11¼	18·6	WIEDENTHAL	—	SER. Wb (40 t.). Cr (5 t.).
			Tunnel	*c.* 600 m. long.
11¾	19·1		Tunnel	*c.* 300 m. long.
15	24·2		Bridge over road and R. Speyer	—
15¼	25·0		—	J (trailing) right, ST DE line to Elmstein.
16	26·0	LAMBRECHT	—	SER. Wb (70 t.). Cr (6 t.).
18	29·0		Tunnel	*c.* 600 m. long
			Bridge over R. Speyer	—
20	32·4	NEUSTADT		Main station. SER. Wb (40 t.). (Cr 5 t.) ES. W
20¼	32·7			J (facing) right with DT s.o. line to Landau (Route 71), also to MY.
21	33·7		—	J (trailing) right from MY. J (facing) left with ST s.o. line to Monsheim Line runs without curvature to Schifferstadt

Distance from KAISERLAUTERN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
25½	41·0	HAFENLOCH	Bridge over road	SER. Wb (40 t.).
27½	44·8	BOBL—IGGELHEIM	Bridge over road	SER. Wb (40 t.).
30½	49·0		—	J (trailing) right, with DT s.o. line from Speyer and Germersheim.
30½	49·5	SCHIFFERSTADT	—	SER. Wb (40 t.). Cr (6 t.). Line turns North and runs without curvature to Ludwigshafen.
33½	53·5	LIMBURGERHOF	Bridge over main road	SER. Wb (40 t.).
35	56·4	RHEINGÖNHEIM	—	Wb (35 t.).
36	58·2	LUDWIGSHAFEN—MUNDENHEIM	Bridge over road	Wb (35 t.). Cr (4 t.).
36½	58·7		—	J (facing) left to MY and Loco. Depot.
				MY—hump. *c.* 10 LS (reception). *c.* 10 LS (departure). *c.* 25 LS (marshalling). Capacity 2,200 per 24 hours.
				Loco. Depot.
				2 ES (large)—roundhouse type. Workshops attached.
				2 Tbls. W.
36½	59·2		—	J (facing), left to main station, right to Mannheim.
37	59·5		Railway overbridge	—
				Line passes under DT line from main station to Mannheim. Rp S (carriage and wagon) on left of line.
37½	60·5		—	J (trailing) left, from Rp S and DT line from Worms.
				J (facing) left, to dock sidings. SY at dock side. *c.* 10 LS.
38½	61·6	LUDWIGSHAFEN (RHEIN)	—	Terminal passenger station. 5 platforms.
				SER. Wb (60 t.). Cr (10 t.). For air photograph of Ludwigshafen, see Appendix 9.
		LUDWIGSHAFEN (OGGERSHEIM)		On DT line to Worms—distance 4·8 km.
			—	SER. Wb (20 t.).
37½	60·7	LUDWIGSHAFEN (MITTE RHEIN)	—	Passenger traffic only. (Distance from main station 3·3 km.).
38½	61·4		Bridge over Rhine and railway (Rheinbrücke)	Total length *c.* 400 m. 3 spans (steel-braced girders) ×91 m., also masonry side spans. Bridge also crosses loop to main goods station.
38½	61·8	MANNHEIM	—	*c.* 7 passenger platforms. Main goods station (between confluence of Rhine and Neckar).
				SER. Wb (60 t.). Cr (20 t.).
				Rp S (carriage).
				Cleaning sheds—E. of station. E. of Rp S SY adjoining goods Yard. 24 LS.
			—	*Goods station (E. of station).*
			Road overbridge	SER. Wb (60 t.).
38½	62·6		—	J (facing) right, with DT s.o. line to Schwetzingen and Karlsruhe—distance to Schwetzingen 12·2 km.

Distance from KAISERLAUTERN *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
			—	J (facing) left, with DT s.o. line to Frankfurt, via Biblis.
39½	63·6		Flyover	Line passes under DT connection from MY to Biblis line. J (facing) to loco. depot and MY.
				Loco Depot. ES (large) rectangular. Tbl. W. Workshops attached.
40½	65·5	MANNHEIM (MY)	—	Passenger halt. MY—hump—East- and West-bound yards. *Eastbound.* Reception—c. 14 LS. Marshalling—28 LS+12 LS. Subsidiary group for sorting—14 LS. Departure—c. 22 LS. *Westbound.* Reception—12 LS. Marshalling—24 LS. Departure—12 LS. Capacity—7,000 per 24 hours. *Translip sheds*—8 LS. For air photograph of layout at Mannheim, see Appendix 10.
41½	67·3		Road overbridge	—
42	67·7	MANNHEIM—SECKENHEIM		Passenger traffic only.
43½	70·2		—	J (triangular) right, with DT s.o. line to Schwetzingen and Karlsruhe (Route 67), also to Heidelberg—Wurzburg and Heidelberg—Karlsruhe. Line turns N.
43½	70·6	MANNHEIM—FRIEDRICHSFELD	—	SER. Wb (30 t.). Line continues to Darmstadt and Frankfurt, as Route 67.

STATIONS in MANNHEIM area on DT line to BIBLIS, see J (flyover at 63·6).

Distance from MY.				
0	0	MANNHEIM (MY)	—	—
2½	4·0	MANNHEIM (KAFERTAL)	—	SER. Wb (100 t.).
4½	7·0	MANNHEIM (SAMMELBF.)	—	Passenger traffic only.
		MANNHEIM (INDUSTRIEHAFEN)	—	Goods only. Wb (75 t.).
Distance from SAMMELBF.				
0	0	MANNHEIM (SAMMELBF.)	—	Passengers only.
1½	2·6	MANNHEIM (WALDHOF)	—	SER. Wb (40 t.). Cr (5 t.).
1½	3·0	MANNHEIM (LUZENBERG)	—	Passengers only.
4	6·4	MANNHEIM (NECKARSTADT)	—	(N. bank of Neckar.) SER. Wb (40 t.). Cr (15 t.).

MANNHEIM—FRANKFURT, via BIBLIS

0	0	MANNHEIM (MY)	—	—
5½	9·0	MANNHEIM (WALDORF)	—	—
10½	17·1	LAMPERTHEIM	—	J (ST) to Worms.
19½	31·6	BIBLIS	—	J (DT) to Worms.
30½	49·2	GODDELAU—ERFELDEN	—	—
36	58·0	GROS. GERAU	—	J (DT) Mainz Wiesbaden.
52½	84·4	FRANKFURT (MAIN)	—	—

ROUTE 66

SAARGEMÜND—ZWEIBRÜCKEN—LANDAU—GERMERSHEIM—WÖRTH—KARLSRUHE

General Details.

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 169·8 km. (105½ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available, but route follows valleys of Rivers BLIES, SCHWARTZ, QUEICH and RHINE fairly closely.
6. *Curvature :* No details available, winding course along R. SCHWARTZ at 41·8, and information about curves from 3·7 to 131·3 km. given in itinerary.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·2 km. (3¾ miles).
9. *Marshalling Yards (MY) :* SAARGEMÜND (SY), ZWEIBRÜCKEN (SY), KARLSRUHE
10. *Engine Sheds (ES) :* SAARGEMÜND, LANDAU, ZWEIBRÜCKEN, KARLSRUHE.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities referred to in paras. 9 and 10.
    (b) Main junctions at SAARGEMÜND, BIERBACH, LANDAU, GERMERSHEIM, WÖRTH and KARLSRUHE.
    (c) Bridges—the most important are those over the SAAR and RHINE at 2·3 and 158·3 km.
    (d) Tunnels—at 66·7 and 71·7 km.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each.

Distance from SAARGEMÜND

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	SAARGEMÜND (SARREGUEMINES)	—	*Passenger station*—5 platforms (4 island). *c.* 200 m. long.
				Goods station 10 DES. Wb. Cr. SER.
				SY. 19 LS. *c.* 600 m. long.
				Loco. depot—2 ES (large) roundhouse., 2 tbl. W. 8 short DES.
				R/b S—carriage and wagon—served by 7 short DES.
				Storage sidings—9 DES. *c.* 500 m. long. 6 LS. *c.* 960 m. long. 10–15 short DES.
				Romolfino shunting yard is on the Saargemünd — Mommenheim line. c. 2 km. S. of Saargemünd station.
				Line runs S.
¼	1·0		—	J (triangular) right with DT, s.o. line to Saarburg.
1¼	2·3		Bridge over R. Saar	—
			—	Line curves N.E. Curve *c.* 700 m radius.
2¼	3·7		—	J (facing) left, with ST s.o. line to Hagenau.
2¾	4·5	FOLPERSVILLER	—	SR.
			Railway overbridge	Line passes under ST s.o. line to Hagenau.
			—	J (facing) right to Hagenau line (rails removed).
4¼	7·0	BLIES-EBERSING	—	Halt.
				Line turns S. and follows course of R. Blies to Elmöd.
6½	10·4	BLIESBRUCK	—	Wb. SER.
7¼	11·7		—	Frontier.
				Line turns N.

Distance from SAARGEMÜND *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
7½	12·6	REINHEIM (SAAR)	Bridge over road	Wb (40 t.). Customs station.
9	14·7	GERSHEIM	—	Wb. SER.
11	17·7	BLIESDALHEIM	—	Wb (30 t.).
11½	18·7	BLIESDALHEIM DORF	—	Passenger halt.
13½	21·7	BREITFURT	—	SR.
14	22·7		Bridge over R. Blies	—
14½	23·6	BLICKWEILER	—	SR.
16½	26·4	BLIESKASTEL	—	Wb (35 t.). Cr (4 t.). SER. Customs office.
17½	28·0		—	J (trailing) from left, with ST s.o. line from St. Ingbert (Route 60).
18½	30·0	BIERBACH	—	Wb (40 t.). SR.
20	32·3		Bridge over R. Blies	J. (triangular) left, with DT s.o. line to Homburg and Mainz.
			—	Line curves S. along course of R. Schwarz.
20½	33·4	EINÖD (SAAR)	—	—
22½	36·4		Bridge over R. Schwarz	—
23	36·9	ZWEIBRÜCKEN	—	3 platforms (2 island). 4 DES. Wb (80 t.). Loading place with warehouse. Cr (8 t.). SER. SY—*S. of station.* Group of 10 LS. Length *c.* 500 m. each. *E. of station* — ES (small), roundhouse, workshop facilities; see Appendix No. 16 for air photographs.
23½	38·3		—	J (facing) right with ST s.o. line to Brenschalbach. Line curves N. for *c.* 1·8 km. and then turns E. Curve radius *c.* 400 m.
24½	39·2		Bridge over road	—
25½	40·6	TSCHIFFLICK—NIEDERAUERBACH	—	—
26	42·8		—	Sharp curve S. Radius *c.* 400 m. Line pursues a winding course along river.
27½	44·0	CONTWIG	—	SER.
30	48·2	DELLFELD	—	—
32½	52·9	RIESCHWEILER	—	SR.
36	58·0		—	J (trailing) from left, with ST s.o. line from Kaiserslautern.
36	58·1	THALEISCHWEILER—FRÖSCHEN	—	Wb (35 t.). Cr. (2 t.). SER.
36½	58·6		—	J (facing) right ST s.o. line to Pirmasens (Nord). (Wb (40 t.). SER) distance 2·2 km.
39½	64·2	RODALBEN	—	Wb (35 t.). Cr. (6 t.). SER.
41½	66·7		Tunnel *c.* 600 m.	Line curves S.
44	70·7	MÜNCHWEILER (RODALB)	—	Wb (40 t.). Cr (5·5 t.) SR.
44½	71·7		Tunnel	*c.* 1 km. long.

Distance from SAARGEMÜND *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
46½	75·2	KALTENBACH (PFALZ)	—	Passenger station only.
48	77·1	HINTERWEIDENTHAL BAHNHOF	—	Passenger station only.
			Bridge over river	—
48½	77·7		—	J (trailing) right, with ST s.o. line Bundenthal—Rumbach.
50½	81·7	HAUENSTEIN (PFALZ)	—	Wb (35 t.). SER.
53½	85·8	WILGARTSWIESEN	—	Wb (40 t.). SR.
56	90·1	RINNTHAL	—	Wb (35 t.). SR.
58	93·5		Bridge over R. Queich	—
58½	93·8	ANNWEILER	—	Wb (35 t.). SER.
60½	98·0		Bridge over R. Queich	—
61	98·4	ALBERSWEILER (PFALZ)	—	Wb (35 t.). Cr (2 t.). SR. Line turns S. to Landau.
62½	100·4	SIEBELDINGEN—BIRKWEILER	—	—
64	103·0	GODRAMSTEIN	—	SR.
65½	105·8	LANDAU (PFALZ) WEST	—	Restricted facilities for loading and unloading goods. SER. Line curves N. Radius *c.* 400 m. Length *c.* 800 m. J (trailing) right, with (1) DT s.o. line from Winden; (2) ST s.o. line from Herxheim.
67½	108·8	LANDAU (PFALZ) MAIN STATION	—	Wb (40 t.). Cr (5 t.) Head customs office. Loading place with warehouse. SER. ES.
			Flyover	Line passes under DT s.o. line to Neustadt. Line curves E.
69½	111·9	DAMMHEIM	—	Passenger station only.
70½	114·0	DREIHOF	—	SER.
72	116·0	HOCHSTADT (PFALZ)	—	SR.
73½	118·9	ZEISKAM	—	Wb (60 t.). SER.
75½	121·6	LUSTADT	—	Wb. (40 t.). SER.
78	125·4	WESTHEIM (PFALZ)	—	SER. Line turns S.
79	127·2		—	J (trailing) left, with DT s.o. line from Speyer (Route 69).
80½	129·7	GERMERSHEIM	—	Wb (35 t.). Cr (5 t.). Customs office. SER.
81½	131·3		—	J (facing) left, with DT s.o. line to Graben (Route 70). Line curves W. for *c.* 1·5 km. then S.
83½	134·7	SONDERNHEIM	—	SER. Line turns W. for *c.* 4·5 km., then S. to Wörth.
87	140·2	BELLHEIM	—	Wb (40 t.). Cr (2 t.). SER.
88½	142·7	RÜLSHEIM	—	Wb (35 t.). SER.

Distance from SAARGEMÜND Miles	Kms.	Station	Engineering Works	Details and Facilities
91½	147·2	RHEINZABERN	—	SER.
			Bridge over 2 roads	—
92½	149·2		Bridge over river	—
93½	150·4	JOCKGRIM	—	Wb (35 t.). SR.
96½	155·6		Road overbridge	J (trailing) right, with ST s.o. line from Winden (Route 71).
97	156·1	WÖRTH (PFALZ)	—	Wb (70 t.). Cr (2 t.). SER. Customs office.
97½	157·5		—	J (facing) right, with ST s.o. line to Lauterburg (Route 80).
98	157·7		—	J (facing) left, with small branch to docks, also private siding to lino. factory—rails removed.
98½	158·2	MAXIMILIANSAU	—	SER.
98½	158·3		Bridge over Rhine	360 m. 2 spans×180 m.
98½	158·8	KARLSRUHE RHEINBRÜCKE	—	Wb. (35 t.). SER.
				Siding, trailing connection to riverside.
100½	161·8	KARLSRUHE—KNIELINGEN	—	Wb (40 t.). SR.
101½	163·2		—	J (trailing) from left with ST s.o. branch line from Graben. DE spur, facing connection, length *c.* 2·4 km.
101½	163·7	KARLSRUHE—MÜHLBURG		Restricted goods facilities.
102½	164·8		—	J (trailing) from right, with various sidings serving electric power station and factories in the region of Rheinhafen docks.
102½	165·1	KARLSRUHE, WEST	—	Passenger station only.
				Connection N. and S. of station to private sidings, including Junkers and Siemens works.
				ES (N. of station) roundhouse Tbl.
103½	169·8	KARLSRUHE (MAIN STATION)	—	Restricted goods facilities. Wb (40 t.). SER.
				Passenger Station. 5 through platform lines. 2 bay platform lines. (W end of station.)
				SY E. of goods station *c.* 10 LS *c.* 300-400 m. long.
				RpS—locomotives at Offenbach.
				Loco Depot.
				ES—rectangular—large—2 Tbl.
				MY—capacity 3,300 wagons per 24 hours—ES (rectangular). Tbl. W.

ROUTE 67

KARLSRÜHE—GRABEN-NEUDORF—MANNHEIM—DARMSTADT—FRANKFURT

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 133·9 km. (83 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but should not be serious.
6. *Curvature :* No details available, but should not be serious.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 7·5 km. (4½ miles).
9. *Marshalling Yards (MY) :* KARLSRÜHE. MANNHEIM. DARMSTADT. FRANKFURT.
10. *Engine sheds (ES) :* KARLSRÜHE. GRABEN-NEUDORF. MANNHEIM. WEINHEIM. DARMSTADT. FRANKFURT.
11. *Watering facilities :* KARLSRÜHE. MANNHEIM. FRANKFURT. GRABEN-NEUDORF. DARMSTADT.
12. *Vulnerable points :*
    (a) Marshalling and Locomotive facilities referred to in paras. 9 and 10.
    (b) Junctions at KARLSRÜHE, GRABEN-NEUDORF, HOCKENHEIM, SCHWETZINGEN, MANNHEIM, DARMSTADT and FRANKFURT.
    (c) Bridges on route—the most important being those at 25·7 km. over R. SAAL, at 56·8 over R. NECKAR, and 131·9 km. over R. MAIN.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distances from KARLSRÜHE

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KARLSRÜHE	—	5 main platforms (island), *c.* 350 m. long. 2 bay platforms W. end of station, probably for ST electric line to Herrenalb—26½ km.
			Bridge over canalised arm of Alb	—
			Bridge over road and railway	—
				Goods station S. of passenger station. SER. Wb (40 t.)—apparently only for direct loading and unloading to road vehicles.
				SY E. of goods yard—10 LS *c.* 300—400 m. long.
				Loco. depot W. of passenger station — rectangular ES (*c.* 100×70 m.)—12 roads—2 This group of 11 LS in yard.
				MY E. of passenger station—capacity 3,300 wagons per 24 hours.
				16 LS (N. of yard) *c.* 650 m. long with 2 transhipment sheds Wb (60 t.). Cr (20 t.).
				16 LS *c.* 900 m. long.
				8 LS *c.* 700 m. long.
				ES (100×30 m.) rectangular. Tbl. W.
				8 LS *c.* 700 m. long.
				Rp S (locomotives) at Offenbach.
				Connection from E. end of MY to local goods station, also to Rp S (locomotive)—total employed 1,108.

Distances from KARLSRUHE				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
½	1·2		—	J (facing) right, with DT line to Stuttgart (Route 75). For layout at Karlsruhe, see Appendix 5.
1	1·6		Flyover	Line passes over connection to Rp S.
1	1·8		Bridge over road	—
1½	2·6		Bridge over arterial road	—
2½	3·6		Flyover	Line crosses flyover connection from avoiding line from MY.
2½	4·1		—	J (trailing) right, with avoiding line from MY.
2½	4·6		—	J (trailing) left, with flyover connection from MY.
3½	5·5	KARLSRUHE—HAGSFELD	—	SR. Wb (35 t.).
3½	6·1		Bridge over main road	—
6½	10·3	BLANKENLOCH	—	SER. Wb (35 t.). Cr (6 t.).
6½	10·9		Bridge over main road	—
8½	13·4		Bridge over main road	—
9	14·7		Bridge over main road	—
9½	15·1	FRIEDRICHSTAL	—	SR. Wb (35 t.).
9½	15·5		Bridge over main road	—
10	16·0		Bridge over R. Hegiach	—
12½	20·1		—	J (trailing) left, with ST s.o. line from Karlsruhe-Mühlburg.
12½	20·6		—	J (trailing) right, with DT s.o. line from Bruschal and Mühlacker (Route 70).
13	20·9	GRABEN-NEUDORF	—	SR. Wb (35 t.). ES.
13½	21·4		Road overbridge	—
			—	W. Tbl.
14	22·6		—	J (facing) right, DT flyover connection to Germersheim (Route 70).
14½	23·2		Flyover	Line passes under line to Germersheim.
16	25·7		Bridge over R. Saal	*c.* 150 m. long.
16	26·0		Bridge over arm of R. Saal	—
17½	28·2	WIESENTAL		Passenger station only.
			Bridge over main road	—
18½	30·2	WAGHÄUSEL	Bridge over road	SER. Wb (35 t.).
19½	31·3	KIESLACH		Passenger station only.
22½	36·4	NEULUSSHEIM	—	SER. Wb (25 t.).
23½	38·1	HOCKENHEIM	—	SER. Wb (40 t.).
			Bridge over main road	
24½	39·2		Bridge over main road	—
25	40·1		Bridge over arterial road	—
26½	42·2		—	J (trailing) left, with ST s.o. line from Speyer (J for DT line from Germersheim—Ludwigshafen) (Route 69).
28	45·0	OFTERSHEIM	—	Passenger station only.
			Bridge over main road	—
28½	46·1	SCHWETZINGEN	—	SR. Wb (35 t.). Cr (4 t.).
29	46·6		—	J (facing) right, with DT s.o. line to Heidelberg, Würzburg and Karlsruhe.
29½	47·0		—	J (facing) left, with DT s.o. line to Mannheim (Main station) and Ludwigshafen.
29½	47·6		Bridge over main road	—

Distance from KARLSRUHE

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
32	51·8		—	J (facing) right DT loop connection to DT s.o. line Mannheim—Heidelberg also Mannheim MY.
32½	52·6		Bridge over railway	Line crosses loop connection referred to above.
32½	52·8		Bridge over railway	Line crosses DT s.o. line Mannheim—Heidelberg.
33	53·1		—	J (trailing) left, with DT s.o. line from Mannheim (Main station) and *MY*, Route 65; right with DT s.o. line from Heidelberg.
33½	53·6	MANNHEIM—FRIEDRICHSFELD	—	SER. Wb (80 t.).
				For details of *MY* (capacity 2,000 wagons per 24 hours) at Mannheim, see Route 65 and Appendix 10.
			Road overbridge	Line passes under autobahn.
34	54·9		Bridge over main road	—
35½	56·8	LADENBURG	—	SER. Wb (60 t.).
36	57·8		Bridge over road	—
38½	61·9	GROSSACHSEN—HEDDESHEIM	—	SER. Wb (40 t.).
			Bridge over road	—
39½	63·1	LUTZELSACHSEN	—	Passenger station only.
			Bridge over road	—
39¾	64·1		Railway overbridge	Line passes under ST line from Lampertheim.
40½	64·7		—	J (trailing) right, with above-mentioned ST line.
			Bridges over several roads in Weinheim	—
41	66·3	WEINHEIM	—	SER. Wb (40 t.). Cr (5 t.). ES.
44	70·7	HEMSBACH	—	SER. Wb (40 t.).
46½	75·0	LAUDENBACH	—	SER. Wb (42 t.).
			Bridge over main road	—
48¾	78·5	HEPPENHEIM	—	SER. Wb (40 t.). Cr (·75 t.).
50¾	1·8		Bridge over R. Meer	—
51	82·0		—	J (trailing) left with ST line from Worms.
51½	83·0		Road overbridge	—
51¾	83·1	BENSHEIM	—	Wb (40 t.). Cr (10 t.).
52¾	84·1		Bridge over R. Winnel	—
53	85·3	AUERBACH	—	SER. Wb (40 t.).
			Bridge over stream	—
54½	87·9	ZWINGENBERG	—	SER. Wb (35 t.).
55½	89·3	ALSBACH—HAHNLEIN	—	Passenger station only.
56	90·2		—	J (trailing) left, with short ST DE line from Pfungstadt.
60½	97·1	DARMSTADT—EBERSTADT	—	SER. Wb (40 t.).
63	101·7	DARMSTADT SÜD	—	Passenger halt.
63½	102·2		Bridge over main road	—
63¾	102·6		Bridge over main road	—
64½	103·7	DARMSTADT	—	Main Station—6 platforms (4 islands).
				Loco. depot W. of Station—2 ES, roundhouse (large), workshops attached. W.

Distance from Karlsruhe Miles	Kms.	Station	Engineering Works	Details and Facilities
		Darmstadt (*contd.*)	—	*Rp S—locomotive* S. of loco. depot.
				Rp S—passenger and goods rolling stock N. of Rp S loco.—total employed 1,289 (including operating staff).
				For air photograph of Darmstadt, see Appendix 14.
				Goods Yard—E. of station large goods shed, several DES with road access.
				SER. Wb (50 t.). Cr. (7·5 t.).
65½	106·0		—	J (facing) left to (1) Flyover connection to Rp S (rolling stock) E. of line; (2) DT s.o. line to Gerau, Mainz and Wiesbaden; (3) Diverging line from Frankfurt.
65½	106·2		Flyover	Line passes over loop to Rp S.
66	106·5		—	J (facing) right, with DT line from Gr. Gerau and Biblis.
66	106·5		Flyover	Line passes over DT line Gr. Gerau—Dieburg.
66½	106·8		—	J (trailing) right, with connection from line Gr. Gerau—Dieburg.
67	107·8		—	J (trailing) left with diverging line.
69½	111·6	Darmstadt-Arheilgen	—	SER. Wb (40 t.).
70½	113·0		Bridge over road	—
70½	113·4	Wixhausen	Bridge over road	SER. Wb (40 t.).
72½	115·6	Erzhausen	Bridge over road	—
73	117·6	Egelbach	Bridge over road	SER. Wb (40 t.).
74½	120·4	Langen	Bridge over road	SER. Wb (32 t.).
76½	123·2	Buchschlag-Sprendlingen		SR. Wb (40 t.).
78½	126·7	Neu Isenburg	—	SER. Wb (33 t.).
80½	129·7		Railway overbridge	Line passes under DT s.o. line Goldstein — Offenbach and MY (capacity 2,700 wagons per 24 hours).
80½	130·2	Frankfurt-Louisa	—	Passenger station only.
81½	130·7		—	J (facing) right to goods station (Frankfurt Süd—see Route 86 for details of facilities).
81½	131·5		—	J (trailing) right from Frankfurt Süd.
82	131·9		Bridge over R. Main	Total length 283·3 m., 5 spans ×52·84 m.
			—	J (facing) left to *MY* and goods station.
83	133·9	Frankfurt	—	Main Station.
				Goods Station (N. of passenger station). SER. Wb (51 t.). Cr. (25 t.).
				MY—E. of Goods Yard—capacity 2,700 wagons per 24 hours.
				Rp S (Frankfurt Nied)—locomotive (1,429 personnel employed). Route 52.
				Loco. Depot—N. of passenger station and adjoining *MY*. 1—ES, rectangular. 2—ES., roundhouse. 1 other ES. Tbls. W.

ROUTE 67A

KARLSRÜHE—BRUCHSAL

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 21·3 km (13¼ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* Negligible.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·2 km (3¼ miles).
9. *Marshalling Yards (MY) :* KARLSRÜHE.
10. *Engine sheds (ES) :* KARLSRÜHE, BRUCHSAL.
11. *Watering facilities :* KARLSRÜHE, BRUCHSAL.
12. *Vulnerable Points :* Junctions, Marshalling Yards and Locomotive facilities at KARLSRÜHE and BRUCHSAL.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distance from KARLSRÜHE

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KARLSRÜHE (Main passenger station)	—	SER. Wb (40 t.). Rps. ES.
				Main Goods Station. SER. Wb (40 t.). Cr (20 t.).
		KARLSRÜHE (MY)	—	Wb (60 t.). Cr (20 t.). ES. SER. Wb (40 t.). Cr (20 t.). (For description, see Route 75.)
3	4·7	KARLSRÜHE—DURLACH	—	SER. Wb (40 t.). Cr (20 t.). SY.
3¼	5·2		—	J (facing) left, with DT s.o. line to Stuttgart (Route 75).
7½	12·2	WEINGARTEN (BADEN)	Bridge over road	SER. Wb. (40 t.).
10	16·1	UNTERGROMBACH	Bridge over road	SER. Wb (25 t.). Cr (2 t.).
12¾	19·9		Railway overbridge	Line passes under flyover connection to Mühlacker (Route 70).
12¾	20·8		—	J (trailing) left, with flyover connection to Mühlacker right, with DT s.o. line from Mühlacker (Route 70).
13	21·3	BRUCHSAL	—	SER. Wb (35 t.). Cr (6 t.). ES (small), roundhouse. Tbl. W. J. for DT. s.o. line N. to Heidelberg, E. to Mühlacker, W. to Graben—Neudorf.

ROUTE 68

WINTERSDORF—RASTATT—KARLSRÜHE

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 29·9 km (18½ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 7·2 km (4½ miles).
9. *Marshalling Yards (MY) :* KARLSRÜHE.
10. *Engine Sheds (ES) :* KARLSRÜHE, RASTATT.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities at KARLSRÜHE and RASTATT.
    (b) Junctions at 5·8, 8·1 and at KARLSRÜHE.
13. *Capacity :* 72 trains per day each way, of 500 tons net train load each.

Distance from WINTERSDORF

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	WINTERSDORF (BADEN)	—	Frontier station. Wb (80 t.). SR.
1¼	2·0		Bridge over light railway line	Rastatt—Kehl.
3½	5·8		—	J (trailing), with DT s.o. line running S.W. to Appenweier.
4	6·7		Bridge over tributary of R. Rhine	— —
4½	7·2	RASTATT	—	Wb (35 t.). Cr (10 t.). SER. ES (small); for layout, see Appendix 13.
				J (trailing), with ST line running S. to Freudenstadt.
5	8·1		—	J (facing), with double track line to Karlsruhe, via Ettlingen.
7¾	12·7	ÖTIGHEIM	—	Wb (35 t.). Cr (2 t.). SR.
9½	15·5	BIETIGHEIM (BADEN)	—	Wb (25 t.). Cr (2 t.). SR.
11	17·8	DURLACH	—	Wb (35 t.). Cr (4 t.). SER.
15½	24·8	FORST	—	—
17¼	27·7		Bridge over light railway	—
17½	28·1		—	J (facing) right, with avoiding line to MY.
17¾	28·5		—	J (trailing), with DT s.o. line to Wörth.
				J (facing), with ST loop line to MY, also Rangierbhf. (Goods station).
18	29·1		Bridge over railway	Line passes over loop line to MY.
		KARLSRÜHE—RANGIERBHF.	—	Wb (35 t.). Cr (20 t.). SER. Goods station.
18½	29·9	KARLSRÜHE (Main station)	—	Wb (40 t.). SER.
				MY—3,300 wagons per 24 hours. ES.

ROUTE 69

SCHIFFERSTADT—GERMERSHEIM

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 22·5 km. (14 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available, but it is not anticipated that these will be severe.
6. *Curvature :* No details available, but it is not anticipated that curves will be severe.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9·1 km. (5½ miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine sheds (ES) :* None.
11. *Watering facilities :* No information.
12. *Vulnerable points :* Junctions at SCHIFFERSTADT and at 20·8 km. (GERMERSHEIM.)
13. *Capacity :* 60 trains per day each way, of 500 tons net train load each.

Distance from
SCHIFFERSTADT

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0		—	Distance from Kaiserslautern—49·3 km.—Route 65. Distance to Mannheim (MY)—17 km. (Route 65).
0	0	SCHIFFERSTADT	—	SER. Wb (40 t.). Cr (6 t.). Line runs West to J.
4	6·4		—	J (facing) right, with DT s.e. line to Kaiserslautern—distance 49·3 km. Line turns S.E.
5½	8·7		—	J (trailing) left, with ST s.e. line from Schwetzingen.
5½	9·1	SPEYER	Several bridges over and under roads in town	SER. Wb (35 t.). Cr (6 t.).
5⅝	9·3		Bridge over R. Speyer	—
7½	11·6		Bridge over main road	—
8	12·8	BERGHAUSEN (PFALZ)	Bridge over road	SR.
8⅝	14·2	HEILIGENSTEIN (PFALZ)	—	—
9	14·6		Bridge over road	—
12	19·4	LINGENFELD	Bridge over road	SER.
13	20·8		—	J (trailing) right, with DT s.e. line from Landau, Zweibrücken and Saargemünd—Route 66.
14	22·5	GERMERSHEIM	—	SER. Wb (35 t.). Cr (5 t.). Line continues to :— (1) Karlsruhe, as Route 66—distance 42·4 km. (2) Mühlacker — Route 70, thence to Stuttgart, as Route 75—to München—route 82.

ROUTE 70

GERMERSHEIM—GRABEN-NEUDORF—BRUCHSAL—BRETTEN—MÜHLACKER

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 57·7 km. (35⅞ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 18 tonnes (GERMERSHEIM—GRABEN-NEUDORF).
   20 tonnes (GRABEN-NEUDORF—BRETTEN—MÜHLACKER).
5. *Gradients :* No details available, but rising gradients may be expected running East.
6. *Curvature :* No details available, and information shown in description of line has been taken from maps 1/100,000.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·7 km.
9. *Marshalling yards (MY) :* None on route.
10. *Engine sheds (ES) :* BRUCHSAL. MÜHLACKER.
11. *Watering facilities :* No details available.
12. *Vulnerable Points :*
    (a) Engine sheds at BRUCHSAL and MÜHLACKER.
    (b) Main Junctions at GERMERSHEIM, GRABEN-NEUDORF, BRUCHSAL, BRETTEN and MÜHLACKER.
    (c) Bridges and tunnels on route, see description of line.
13. *Capacity :* 60 trains per day each way, of 400 tons net train load each.

Distance from GERMERSHEIM

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	GERMERSHEIM	—	Wb. (35 t.). Cr (5 t.). SER. J (facing) right, with DT s.o. line to Karlsruhe (see Route 66). Line turns East across Rhine and then bears N.E. to Phillipsburg.
1	1·6		Bridge over R. Rhine	c. 328 m. long. Girder bridge on masonry piers—4 spans, 17m.+3×90 m.
2	3·2	[illegible]	—	SR. Wb (25 t.).
2⅛	3·4		Bridge over Pfinz canal	—
3⅞	6·2	PHILLIPSBURG	—	Wb (25 t.). SER (short). Line turns S.
6⅛	10·4	HUTTENHEIM	—	SER. Wb (25 t.).
7⅞	12·3		Flyover	Line passes under/over DT s.o. line Graben-Neudorf — Mannheim. J (trailing) right, with DT s.o. line from Mannheim.
			Bridge over R. Hegbach	—
				Line continues 4-track through Graben.
9⅛	15·4	GRABEN-NEUDORF	—	SER. Wb (25 t.). J (facing) right, with DT s.o. line to Karlsruhe (Hbf), also ST s.o. line to Karlsruhe (Mühlburg). Line bears E. on curve of c. 600 m. radius.
12⅝	20·5	KARLSDORF	—	SR. Wb (35 t.).
15	24		—	J (trailing) right. Line joins DT s.o. line (Heidelberg—Karlsruhe) to Bruchsal.
15⅛	24·9	BRUCHSAL	—	SER. Wb (35 t.). Cr (6 t.). W. ES (medium) roundhouse. Tbl. For air photograph, see Appendix 1.

Distance from GERMERSHEIM

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
15¾	25·4		—	J (facing) right, with DT s.o. line to Karlsruhe, also loop line referred to below (loop enters tunnel 300 m. from J—tunnel *c.* 400 m.).
16¼	26·4		Flyover	Line passes over DT s.o. line to Karlsruhe.
			Tunnel	*c.* 600 m.
16¾	27·0		—	J (trailing) left, with loop connection from DT s.o. line, Heidelberg—Karlsruhe.
				Curve *c.* 300 m. radius—length *c.* 500 m.
18¼	30·0		Road overbridge	—
19¼	30·9		Bridge over R. Saal	Line runs along valley of river.
19½	31·6	HEIDELSHEIM	—	SR. Wb (35 t.). Cr (2 t.).
20¾	33·4	HELMSHEIM	—	Restricted goods facilities.
22¾	36·6	GONDELSHEIM (BADEN)		SER. Wb (35 t.).
			Bridge over river	—
24½	39·4		Flyover	Line passes under ST s.o. line, Grötzingen—Bretten.
25	40·2		Bridge over R. Saal	—
25¼	40·6	BRETTEN	—	SER. Wb (35 t.). Cr (10 t.).
25¾	41·4		—	J (facing) left, with DT s.o. line to Heilbronn (junction for DT s.o. line Stuttgart—Nürnberg).
			Bridge over railway	Line crosses loop connection to DT s.o. line to Heilbronn.
26¼	42·2		—	J (trailing) right, with loop connection to Heilbronn line.
27¾	44·7	RUIT	—	Passenger station.
29½	47·7	OLBRONN	—	Passenger station.
				Line curves N.E. for *c.* 2·5 km. round escarpment; radius *c.* 500 m.
				Line curves South; radius *c.* 500 m.
31¾	51·0		—	J (trailing) left, with D.T. s.o. line to Maulbronn—distance 2·3 km.
32	51·6	MAULBRONN, WEST	—	SER. Cr (5 t.).
		MAULBRONN	—	Wb. (32t.). SER. Cr (30 t.).
32½	52·0		Road overbridge	—
34	54·8	OTISHEIM	Bridge over road	Cr (2 t.).
				J (trailing) right, with DT s.o. line Karlsruhe—Stuttgart.
35¾	57·7	MÜHLACKER	—	Wb. (50 t.). Cr (20 t.). SER. W. ES.
				Line continues DT to Stuttgart (Route 75).

ROUTE 71

NEUSTADT—LANDAU—WINDEN—WÖRTH

General Details.

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 44·8 km. (27⅞ miles).
3. *Track :* NEUSTADT—WINDEN, 31·5 km. Double.
   WINDEN—WÖRTH (Junction). 12·1 km. Single.
4. *Maximum permissible axle load :* 20 tonnes.
5. *Gradients :* No details available, but probably not severe.
6. *Curvature :* No details available, but probably not severe.
7. *Traction :* Steam.
8. *Maximum distance between stations :*
   Double track—5·9 km. (3 miles).
   Single track—6·8 km. (4¼ miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine Sheds (ES) :* NEUSTADT.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable Points :*
    Junctions at NEUSTADT, LANDAU, WINDEN, WORTH.
13. *Capacity :* To WINDEN 60 trains per day each way } of 400/450 tons net
    Onwards from WINDEN 20 " " " " " } train load each.

Distance from NEUSTADT Miles	Kms.	Station	Engineering Works	Details and Facilities
0	0	NEUSTADT	—	SER. Wb (40 t.). Cr (5 t.). ES.
½	0·6 1·2			J. (triangular) with DT s.o. line to Ludwigshafen and Mannheim (Route 65).
			—	Line runs South and across numerous small streams on route, which may be culverted.
⅝	1·8		Bridge over road	—
3⅝	5·9	MAIKAMMER—KIRRWEILER	Bridge over road	SER. Wb (35 t.). Cr (2 t.).
5¼	8·4	EDENKOBEN	—	SER. Wb (40 t.). Cr. (5 t.).
6½	10·6	EDESHEIM	— Bridge over main road	SR. Wb (35 t.). Cr (2 t.).
8½	13·7	KNORINGEN—ESSINGEN	—	SR. Cr (2 t.).
9½	15·4		Bridge over main road	—
9⅞	16·1		Flyover	Line crosses DT s.o. line to Germersheim and Karlsruhe (Route 66).
10	16·7		—	J (trailing) left, with DT line to Germersheim.
11½	18·4	LANDAU	—	SER. Wb (40 t.). Cr (5 t.).
12	19·2		—	J (facing) left, with DT s.o. line west to Saarbrücken and Saargemünd (Route 66).
12½	20·2		—	J (facing) left, with DE ST line to Herrheim—10·9 m.
14½	23·0		Road overbridge	—
14⅞	23·7	INGHEIM	Bridge over road	Wb (40 t.).
16½	26·1	ROHRBACH—STEINWEILLER	Bridge over road	SER. Wb (50 t.). Cr (2 t.).
16½	26·8		—	J (facing) right, with DE ST line to Klingen—Münster, distance 9·5 km.
17	27·5		Bridge over road	—
18⅝	30·0		—	J (trailing) right, with DE ST line from Bergzabern—distance 10 km.

Distance from Neustadt				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
19½	31·0	WINDEN	—	SER. Wb (70 t.).
19½	31·5		—	J (facing) right, with DT s.o. line to Weissembourg (Route 72).
19½	31·5		—	Line continues to J at Wörth as single track.
23½	38·0	KANDEL	Bridge over road	SER. Wb (70 t.). Cr (6 t.).
25½	41·4		Bridge over road	—
26½	43·1		Bridge over road	—
27	43·6		Bridge over road	J (trailing) left, with DT s.o. line from Germersheim (Route 66).
			—	Line continues DT to Wörth.
27½	44·8	WÖRTH	—	SER. Wb (70 t.). Cr (8 t.). J for DT s.o. lines from— (1) Germersheim—Route 66. (2) Karlsruhe—Route 66. (3) Berg—Route 80.

ROUTE 72

WEISSEMBOURG—WINDEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 16·8 km. (10½ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 tonnes.
5. *Gradients :* No details available, but probably not severe.
6. *Curvature :* No details available, but probably not severe.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·7 km. (3½ miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine Sheds (ES) :* None.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    Junctions at WEISSEMBOURG and WINDEN.
13. *Capacity :* 72 trains per day each way, of 400/450 tons net train load each.

Distance from WEISSEMBOURG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	WEISSEMBOURG	—	SER. Wb. Terminus station.
1	1·7		—	J (triangular) right, with lines from Hagenau and Strasbourg.
1½	2·3			
			Bridge over main road	—
3½	5·7	KAPSWEYER	—	SR. Cr (5 t.). Frontier station.
4½	7·0		Bridge over main road	—
5	8·0	STEINFELD	—	Passengers only.
			Bridge over road	—
6½	10·5	SCHAIDT	Bridge over road	SER. Wb (30 t.). Cr (4 t.).
			Bridge over road	—
			—	J (trailing) right, with ST s.o. line from Wörth (Route 71).
10½	16·8	WINDEN	—	SER. Wb (70 t.). Line continues N. to Landau and Neustadt as Route 71.

ROUTE 73

GRÖTZINGEN—BRETTEN

General Details

1. *Gauge:* 1435 mm. (Standard.)
2. *Length:* 17·6 km. (11 miles).
3. *Track:* Single throughout.
4. *Maximum permissible axle load:* 18 tonnes.
5. *Gradients:* No details available.
6. *Curvature:* No details available.
7. *Traction:* Steam.
8. *Maximum distance between stations:* 7·3 km.
9. *Marshalling Yards:* None on route.
10. *Engine Sheds:* None on route.
11. *Watering facilities:* No details available.
12. *Vulnerable points:*
    (a) Tunnel at 4·5 km.
    (b) Flyover at 15·9 km.
    (c) Junctions at GRÖTZINGEN and BRETTEN.
13. *Capacity:* 20 trains per day each way, of 300/400 tons net train load each.

Distances from GRÖTZINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
		GRÖTZINGEN	—	SER. Wb (40 t.). Cr. (15 t.).
¼	17		—	J (facing) right, with DT s.o. line to Stuttgart (Route 75). Line continues as ST and bears N.E. to Bretten.
2¾	4·5		Tunnel	*c.* 200 m. long.
3¼	5·2		—	Line curves south (radius *c.* 300 m.) and follows valley.
4½	7·3	JOHLINGEN	—	Wb (25 t.). SER.
5¾	9·5		Bridge over road	—
6	9·9	WOSSINGEN	—	Wb (25 t.). SER. Line bears N.E.
8¼	13·3	DURRENBÜCHIG	—	Passenger station only.
9¾	15·9		Flyover	Line passes over DT s.o. line Germersheim — Bretten (see Route 70).
10¼	16·6		Bridge over R. Saal	—
10¾	17·1	BRETTEN	—	SER. Wb (35 t.). Cr (10 t.). Customs Office. J (facing), with DT s.o. lines. (1) left to Heilbronn. (2) right to Stuttgart. End of ST. line.

ROUTE 74

BRETTEN—HEILBRONN—HALL—CRAILSHEIM—ANSBACH—NÜRNBERG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 223·5 km. (138¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 16 tonnes (BRETTEN—EPPINGEN).
   18 tonnes (EPPINGEN—HEILBRONN).
   [illegible] tonnes (HEILBRONN—HALL).
   20 tonnes (HALL—NÜRNBERG).
5. *Gradients :* No details available, but spot heights from 1/100,000 maps have been indicated where possible. Heavy rising gradients may be expected travelling eastwards.
6. *Curvature :* No details available, and particulars shown are taken from 1/100,000 maps.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9·5 km. (DOMBÜHL—BUCHELBERG).
9. *Marshalling yards :* HEILBRONN.
   NÜRNBERG.
10. *Engine sheds (ES) :* HEILBRONN.
    CRAILSHEIM.
    ANSBACH.
    NÜRNBERG.
11. *Watering facilities (W) :*
    No details available.
12. *Vulnerable points :*
    (a) Engine Sheds and Marshalling Yards referred to in paras. 9 and 10.
    (b) Junctions at BRETTEN, HEILBRONN, HALL, CRAILSHEIM, DOMBÜHL, ANSBACH and approaches in NÜRNBERG district.
    (c) Tunnels at : 5·2 km.—300 m. long.
    49·4 km.—1 km. long.
    90·4 km.—300 m. long.
    (d) Bridges at : HEILBRONN (over R. NECKAR).
    100·5 (over R. KOCHER)—150 m. long.
    135·5 (over R. JAGST)—*c.* 200 m. long.
    For other bridges, see description of line.
13. *Capacity :* 60 trains per day each way, of 400 tons net train load each.

Distances from BRETTEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	BRETTEN	—	Wb (35 t.). Cr (10 t.). SER. Customs office.
				J (facing) left, with DT s.o. line to Mühlacker (see Route 70).
				J (trailing) left, flyover connection to DT s.o. line referred to above.
⅛	1·4		Bridge over road J and stream	Line turns Northwards.
2½	3·7	GÖLSHAUSEN	—	Passenger station only.
3½	5·2		Tunnel	*c.* 300 m.
4	6·4		Road overbridge	—
4⅝	7·8	BAUERBACH	—	Wb (25 t.). SER.
6⅝	10·7		Road overbridge	—
7	11·4		Bridge over road and river	—
7	11·5	FLEHINGEN	—	Wb (25 t.). Cr (6 t.). SER.
7½	11·8		Bridge over river	—
			—	Line follows valley of R. Kohl.
9½	15·0	ZAISERNHAUSEN	—	Wb (25 t.). SER.
			Bridge over stream	
11	17·7	SULZFELD (BADEN)	—	Wb (40 t.). Cr (6 t.). SER.
			Bridge over road	—
11½	18·2		Bridge over stream	—
12	19·5		Tunnel	*c.* 400 m.
13½	21·3		Bridge over stream	—
14½	23·1		Bridge over road	—

Distances from BRETTEN

Miles	*Kms.*	*Station*	*Eng'neering Works*	*Details and Facilities*
14½	23·6	EPPINGEN	—	Wb (35 t.). Cr (6 t.). SER. 4-track through station.
16¼	26·3		—	J (facing), with ST s.o. line to Steinsfurt and Heidelberg. Line bear S.E. from J.
			Bridge over road	
16⅝	26·9		Bridge over road	—
17	27·5	GEMMINGEN	—	Wb (32 t.). Cr (3 t.). SER.
17½	28·0		Bridge over road	—
18⅝	30·4	STEBBACH AM HEUCHELBERG	—	Wb (40 t.). Cr (3 t.). SER. Line bears E.
20⅛	32·6		Bridge over main road	—
20¼	32·9		Bridge over stream	—
21	33·7	SCHWAIGERN (WÜRTT.)	Bridge over stream	Wb (32 t.). Cr (2·7 t.). SER.
21⅝	35·0		Bridge over light railway	—
22	35·5		Bridge over main road	—
23⅛	37·3	SCHLUCHTERN (BADEN)	—	Passenger station only.
23⅜	37·9		Bridge over light railway	—
23⅝	38·2		Bridge over road and stream	
24	38·5	GROSSGARTACH	—	Wb (32 t.). Cr (1·6 t.). SER.
27	43·7		—	J (trailing) right, with DT s.o. line from Bietigheim.
27½	44·2		Bridge over road	—
28	45·0	HEILBRONN (main station)	—	Wb (40 t.). Cr (20 t.). SER. ES. W. MY—capacity 2,000 wagons per day.
28½	45·8		Bridge over arm of R. Neckar	—
28⅝	46·0		Bridge over R. Neckar	—
28⅞	46·3		—	J (facing) left, with DE s.o. line to Neckarelz. (J for Heidelberg—Würzburg line, Route 62.)
29½	47·5	HEILBRONN (KARLSTOR)	Bridge over road	Passenger station only. I. tramway to Marbach. (J on ST line Ludwigsburg—Michelbach, see Route 78.)
30⅝	49·4		Tunnel	*c.* 1 km.
32½	52·2	WEINSBERG	—	Wb (32 t.). Cr (2·5 t.). SER (less than 7 m. long.)
32⅝	52·9		Bridge over river	—
33⅝	54·3	ELLHOFEN	—	Passenger station only.
34	54·7		Bridge over road	—
34⅛	55·3		Bridge over R. Sulm	—
35	56·2	SÜLBACH	—	Passenger station only.
35	56·4		Bridge over road	—
35⅝	57·6	WILLSBACH (296 m.)	—	Wb (32 t.). Cr (1·5 t.). SER (less than 7 m. long).
			Bridge over tributary of Sulm	
36⅝	59·3	AFFALTRACH	—	Passenger station only. Line bears N.E. and leaves course of Sulm.
38	61·2	ESCHENAU (h. Heilbronn) (234 m.)	—	Wb (25 t.). Cr (1·5 t.). SER (less than 7 m. long).
38⅛	61·4		Road overbridge	—
40⅛	64·0		Bridge over R. Brettach	—
40⅝	65·2		Bridge over road J	—

Distances from BRETTEN				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
40½	65·7	BRETTFELD (625 m.)	—	Wb (30 t.). Cr (1·5 t.). SER (less than 7 m. long).
			Bridge over stream	—
			Several bridges over minor tributaries of R. Brettach	—
44	70·9		Bridge over road and stream	—
44½	71·7	ÖHRINGEN (898 m.)	—	Wb (32 t.). Cr (5 t.). SER. Customs office.
				Curve E. Radius *c.* 500 m
46½	74·9		Bridge over road and river	—
48½	78·6	NEUENSTEIN (898 m.)	—	Wb (32 t.). Cr (1·5 t.). SER (less than 7 m. long).
52	83·7		Bridge over road	—
52½	84·2	WALDENBURG (WÜRTT.)	—	Wb (32 t.). Cr (1·5 t.). SER. J (facing) left, with ST s.o. branch line to Forchtenberg.
52½	84·6		Bridge over stream	—
				Line bears Southwards to Michelbach.
53½	86·4		Road overbridge	—
54½	87·9	KUPFER	—	Wb (32 t.). Cr (1·5 t.). SER.
			Bridge over stream	—
54½	88·3		Bridge over stream	—
57½	92·4	GAILENKIRCHEN (WÜRTT.)	—	Wb (32 t.). Cr (1·5 t.). SER.
60	96·4		Tunnel	*c.* 500 m. long.
60½	96·9		Bridge over road	Line runs South along valley of R. Kocher.
60½	97·4		Bridge over road	—
62½	98·8	SCHWÄB HALL	—	Wb (32 t.). Cr (20 t.). SER. Head customs office.
62½	100·5		Bridge over R. Kocher	*c.* 150 m. Line turns North.
			—	J (trailing) right with ST s.o. line from Bietigheim and Ludwigsburg (Route 78).
63½	102·7		Road overbridge	—
64½	103·7	MICHELBACH (BILS)	—	Passenger halt.
			Bridge over road	—
				J with ST line from (1) Bietigheim } Route 78. (2) Ludwigsburg }
65½	105·9	SCHWÄB-HALL-HESSENTAL	—	Wb (32 t.). Cr (2·6 t.). ER.
			Road overbridge	—
66½	107·4		—	Line turns S.E.
69	111·2		Bridge over road	—
69½	111·7	SULZDORF	—	Wb (40 t.). Cr (2 t.). SER.
69½	111·9		Road overbridge	—
70½	113·4		Bridge over road	—
71	114·2		Bridge over R. Buhler	—
71½	115·2		Bridge over stream	Line turns Northwards.
71½	115·7	VELLBERG	—	Restricted goods facilities.
73½	118·9	GROSSALTDORF	—	Wb (25 t.). Cr (1·5 t.). SER (less than 7 m. long).
75½	121·3	GAUGSHAUSEN	—	Passenger halt.
			Bridge over stream	—

Distance from Bretten Miles	Kms.	Station	Engineering Works	Details and Facilities
76½	122·8	Eckartshausen—Ilshofen (485 m.)	—	Wb (32 t.). Cr (2 t.). SER.
				Line turns S.E.
79	127·4	Maulach (427 m.)	—	Wb (25 t.). Cr (2 t.). ER.
79½	128·4		Bridge over road	Line turns E.
82½	132·4		—	J (trailing) right, with ST s.o. line from Goldshofe. Line turns North.
82½	133·1	Crailsheim (409 m.)	—	Wb (40 t.). Cr (1·9 t.). SER. ES. W.
83	133·5		Bridge over road and R. Jagst	c. 200 m. long.
83½	134·5		—	J (facing) left, with ST s.o. line to Bad-Mergentheim.
83½	135·0		Road overbridge	—
87½	141·0	Ellrichshausen	—	Wb (32 t.). SER.
89½	144·1		Bridge over road	—
90½	145·5	Schnelldorf (468 m.)	—	SER. Wb (31 t.).
			Bridge over stream	—
91½	147·3		Bridge over road	—
93½	150·4	Zumhaus	—	Wb (31 t.). SER.
	151·4		—	J (trailing) left, with ST line to Steinach. (J for line Würzburg—Ansbach.)
94½	152·1		Bridge over R. Woritz	—
95½	153·9		Bridge over road	—
97½	156·4	Dombühl (472 m.)	—	Wb (40 t.). SER. J (facing) right, with ST s.o. branch line to Nördlingen (Route 91).
97½	157·0		Bridge over stream	—
97½	157·4		—	Line turns S.E.
100	160·8		Bridge over stream	—
101	162·5		—	Line turns N.E.
103	165·9	Bücheiberg (430 m.)	—	Wb (32 t.). SER.
104½	167·7		Bridge over R. Aurach and R. Altmuhl	—
104½	167·9			
104½	168·2		Bridge over road	J (trailing), right with ST s.o. DE line from Bechhofen.
105½	169·7	Leutershausen—Wiedersbach (444 m.)	—	Wb (31 t.). SER.
106	170·5		Bridge over road	—
106	170·8	Neunkirchen (G. Ansbach.)	—	Passenger station only (limited traffic).
107½	173·3	Lengenfeld (Mittelfr.)	—	Passenger station only (limited traffic).
108½	174·4		Bridge over road	—
109	175·6		Bridge over road	—
109½	176·0		Bridge over R. Onolz	—
109½	176·5	Schalkhausen	—	Passenger station only (limited traffic).
111	178·6		Bridge over road	J (trailing) left with DT s.o. line Frankfurt—Treuchtlingen (Route 86).
111½	179·1		Bridge over road	—

Distance from BRETTEN				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
111½	179·8	ANSBACH	—	W. Wb (40 t.). Cr (15 t.). ES (large). Roundhouse. Tbl. Workshop facilities. *Goods station—*2 DES. 1 LS with road access. 2 LS serving goods shed. SY. *c.* 12 LS. For layout of Ansbach, see Appendix No. 15.
113	181·6		— Bridge over R. Frankische Rezat	J. (facing) right with DT s.o. line to Gunzenhausen (Route 86).
113½	182·3		Bridge over road	—
114½	183·9		—	Line bears N.E.
116	186·9	SACHSEN (b. ANSBACH)	—	SER.
117	188·4		—	Line bears E.—radius of curve *c.* 700 m.
118	189·9		—	Line bears N.
118½	191·1	WICKLESGREUTH	—	Wb (30 t.). SER.
119½	192·3		—	J (facing) right with ST s.o. line (DE) to Windsbach.
119½	192·6		Bridge over road	—
120½	193·9		Bridge over road	—
122	196·6		Bridge over arterial road, Stuttgart—Nürnberg	—
123	198·1	HEILBRONN (421 m.)	— Bridge over road	Wb (30 t.). SER.
124½	200·1		Bridge over road	
125½	202·1		— Bridge over stream	Line bears N.
126½	203·4	RAITENBAICH	—	Wb (30 t.). SER (less than 7 m. long).
127	204·5		Bridge over tributary of R. Bibert	—
127	204·6	CLARSBACH	—	Passenger station only (limited traffic). Line bears N.E.
129	207·6	ROSS- . WEGBRÜCKE	—	Passenger station only (limited traffic).
129½	208·8	ROSSTAL	—	Wb (31 t.). SER (less than 7 m. long).
130	209·3		Bridge over stream	—
131½	211·4	ANWANDEN	—	Passenger station only (limited traffic).
132½	213·3	RENDORF	—	Passenger station only (limited traffic).
133	214·1	OBERASBACH	—	Passenger station only (limited traffic).
134	215·7	UNTERASBACH	—	Passenger station only (limited traffic).
135	217·1		Bridge over river Rednitz	At least 100 m. long.
135½	218·1		—	J (trailing) left, with ST s.o. line from Unternbibert Rugland.

Distances from BRETTEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
135½	218·3	NÜRNBERG—STEIN	—	(Wb 40 t.). SER.
136	219·0		—	J (facing) right—slip connection to avoiding line Fürth to MY and Regensburg (DT s.o. line).
136½	219·8		Bridge over railway	Line crosses avoiding line referred to above.
137	220·5	NÜRNBERG—SCHWEINAU	Bridge over arterial road Stuttgart—Nürnberg	Wb (40 t.). SER. —
138	222·0		Flyover	Line passes under DT s.o. line Nürnberg—Treuchtlingen (Route 87).
				J (trailing) right, with DT s.o. line to Treuchtlingen (Route 87).
				J (trailing) left, with DT s.o. line from Würzburg (Route 90).
138½	223·5	NÜRNBERG (Main Station)	—	Wb (48 t.). Cr (20 t.). MY. ES. Rp S.
				Terminus of DT electric line Nürnberg—Leipzig.
				J for :— (1) DT s.o. line to Würzburg (Route 90). (2) DT s.o. line to Treuchtlingen (Route 87). (3) DT s.o. line to Regensburg. (4) DT s.o. line to Schwandorf. (5) DT electrified line to Leipzig.
				MY—capacity 2,900 wagons per 24 hours.
				ES, large. Roundhouse. Tbl. W.
			—	Rp S (locomotives—goods and coaching stock). Number of employees, including those employed in MY, 1,728.

ROUTE 78

KEHL—APPENWEIER—RASTATT—KARLSRÜHE—MÜHLACKER—BIETIGHEIM—STUTTGART

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 166·6 km. (103¼ miles).
3. *Track :* Double. 151·6 km. (KEHL—LUDWIGSBURG.)
   6-track. 15 km. (LUDWIGSBURG—STUTTGART.)
4. *Maximum permissible axle load :* 20 tonnes.
5. *Gradient :* No details available, but heavy gradients may be encountered.
6. *Curvature :* No details available, and those shown in description of line are taken from 1/100,000 map.
7. *Traction :* Steam throughout ; in addition, portion of track, LUDWIGSBURG—STUTTGART, is electrified.
8. *Maximum distance between stations :* 5·8 kms.
9. *Marshalling Yards (MY) :* KARLSRÜHE, KORNWESTHEIM, STUTTGART (UNTERTÜRKHEIM. Route 82.)
10. *Engine Sheds (ES) :* KEHL, RASTATT, KORNWESTHEIM, KARLSRÜHE (main station and MY), STUTTGART, PFORZHEIM, MÜHLACKER.
11. *Vulnerable points :*
    (a) Marshalling Yards and Engine Shed referred to in paras. 9 and 10.
    (b) Main junctions at APPENWEIER, RASTATT, KARLSRÜHE (W. and E. of main station), PFORZHEIM, MÜHLACKER, BIETIGHEIM.
    (c) Bridges and tunnels mentioned in description of line, particularly those at 76·0, 81·7, 93·0, 105·9, 141·7 and 163·0 km.
12. *Maximum distance between stations :* 5·8 km.
13. *Capacity :* To KARLSRÜHE, 72 trains per day each way } of 400/450 tons net
    Onwards from KARLSRÜHE, 60 „ „ „ } train load each.

Distances from KEHL

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	KEHL	Bridge over main road to Appenweier	Wb (40 t.). Cr (6 t.). SER. W. ES.
			—	J (trailing), with main line from Strassburg.
			Bridge over stream	Exchange facilities with narrow gauge line to Rastatt (N.) and Offenburg and Seelbach (South).
½	1·1		Bridge over R. Kinzig tributary of R. Rhine	—
			Bridge over road	—
3½	5·2	KORK	—	Wb. (25 t.). Cr (4 t.). SER (not more than 7 m. long).
4	6·6		Bridge over road	—
5½	8·4	KELSHURST	—	Restricted speed facilities. J (facing), with line running South to Offenburg.
8½	13·5	APPENWEIER	—	Wb (35 t.). Cr (4 t.). SER. line turns N. Curve c. 500 m.
8¾	14·2		—	J (facing) right, with ST s.o. line to Griesbach.
9¾	15·8		Road overbridge	—
12	19·3	RENCHEN	—	Wb (25 t.). Cr (6 t.). SER.
			Bridge over road	—
13½	21·5	ÖNSBACH	—	Restricted goods facilities.
15¾	25·5	ACHERN	—	Wb. (35 t.) Cr (20 t.).
			Road overbridge	—
16¼	26·1		—	J (trailing) from right with ST s.o. line to Ottenhafen. (11 km.).
16½	26·5		6 bridges over minor roads in next 6 km.	
19½	31·0	OTTENWEIER	—	Wb. (25 t.). Cr (6 t.) SER. J (trailing) from right, with ST s.o. line from Oberbühlertal.

Distance from KEHL *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
20½	33·5	BÜHL BADEN	—	Wb (35 t.). Cr (6 t.). SER.
			Bridge over major road	—
			Bridge over road	Exchange facilities with narrow gauge line to Rastatt.
23	37·1		Bridge over road	Terminus for branch line to Oberbühlertal.
23½	38·4	STEINBACH	—	Wb (40 t.). Cr (6 t.). SER.
			Bridge over R. Steinbach	—
25½	42·3		Bridge over road	—
26½	42·2	SINZHEIM	—	Wb (25 t.). Cr (6 t.). SER.
			Bridge over Oos canal	—
28½	45·7	BADEN—OOS	—	J (trailing), from right with DT s.o. line from Baden-Baden Stadt.
				Wb (40 t.). Cr (6 t.). SER.
			Bridge over road	—
30½	49·0	HAUENEBERSTEIN	—	—
				J (trailing) from left, with (1) DT s.o. line from Winters-dorf; (2) ST. s.o. line from Freudenstadt.
			Bridge over R. Muerg and canal	—
33½	53·9	RASTATT	—	Wb (35 t.). Cr (10t.). SER. ES (small) Tbl. W. Exchange facilities with narrow gauge line to Kehl. For air photograph see Appen-dix 13. J with: (1) DT s.o. line from Winters-dorf, Obermodern, Saarge-münd, Metz. (2) St s.o. line from Freuden-stadt. (3) DT. s.o. line to Karlsrühe, vin Bietigheim. (Route 68.)
36½	56·5	MUGGENSTURM	—	SER. Wb (40 t.).
38½	62·6	MALSCH	—	SER. Wb (40 t.).
40	64·7		Bridge over stream	—
42	67·9	BRUCHHAUSEN	—	Restricted goods facilities.
43	69·1		Bridge over main arterial road	—
			Ettlingen—Rastatt	J (trailing) right, with ST electric line—see below
44	70·8	ETTLINGEN	—	SER Cr (6 t.). Wb (50 t.). Terminus of ST electric line to Etz, thence as light electric railway to Herrenalb.
46	74·3		—	J (facing) left, with loop con-nection to MY, avoiding main station.
			Bridge over main road	
46½	75·2		Railway overbridge	Line passes under avoiding lines to MY.
47	75·7			
47½	76·0		Viaduct over R. Alb and road c. 70 m. long	J (trailing) left with: (1) DT s.o. alternative line from Rastatt (see Route 68). (2) DT s.o. line from Wörth (see Route 66), also from loco. yard.

Miles	Kms.	Station	Engineering Works	Details and Facilities
47¼	76·5	KARLSRÜHE (main station)	—	5 main platforms (4 island), length *c.* 350 m.
			Bridge over canalised arm of Alb	2 bay platforms W. end of station, probably for ST electric line to Herrenalb (16¼ m.).
				Goods Station S. of passenger station—SER. Wb. (40 t.).—apparently only for loading and unloading direct to road vehicles.
			Bridge over road and railway	
				SY E. of goods yard—10 LS *c.* 300–400 m. long.
				Loco. Depot—W. of passenger station — rectangular ES—*c.* 100×70 m. 12 roads—2 Thls—group of 11 LS in yard. *MY E. of passenger station*—capacity 3,300 wagons per 24 hours—16 LS (N. of yard) *c.* 650m long, with 2 tranship sheds.
				16 LS *c.* 900 m. long. 8 LS *c.* 700 m. long.
				ES (100 m. × 30 m.) rectangular. 8 LS. *c.* 700 m. long.
				Connection from E end of MY to goods station (local), also to Rp S (locomotives), total employees 1,108.
				For layout of Karlsrühe, see Appendix 5.
				J (facing) left to Graben—Neudorf.
			Viaduct (east of station)	Line passes over roads and branches to Rp S, local station, electric power station, gas works and main DT s.o. line to Graben.
			Road overbridge (arterial road, Karlsrühe — Bruchsal —Amtsbezirk)	J (trailing) left to local station.
50¼	81·2	KARLSRÜHE—DURLACH	—	Wb (40 t.). Cr (20 t.). SER.
50¾	81·7		Bridge over R. Pfinz (*c.* 30 m.)	—
			—	J (facing) left DT s.o. line to Bruchsal and Heidelberg (Route 67A).
51	82·4		Road overbridge (arterial road to Bruchsal)	—
52	83·6	GRÖTZINGEN	—	Wb (40 t.). Cr (15 t.). SER. J (facing) left ST s.o. line to Bretten (Route 73).
53	85·6		Bridge over R. Pfinz	—
53½	86·4	BERGHAUSEN (BADEN)	—	Wb (40 t.). SER.
			2 bridges over roads	
			—	Line turns S. and follows course of R. Pfinz to Wilferdingen.
55	88·6	SÖLLINGEN	—	Wb (30 t.). Cr (6 t.). SER.
56¾	91·4	KLEINSTEINBACH	—	Restricted goods facilities.
			Bridge over R. Pfinz	
			Bridge over road	—
57¾	93·0		Bridge over R. Pfinz and road	—

Distance from KEHL *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
58	93·5	WILFERDINGEN	—	Wb (35 t.). Cr. (6 t.). SER (less than 7 m. long). Line curves N.E. along course of R. Kampfel.
59½	96·4	KÖNIGSBACH (BADEN)	—	SER. Wb (25 t.). Line curves S. (radius 1 km.).
60	98·2	BILFINGEN	—	Restricted goods facilities.
62½	100·9	ERSINGEN	—	Wb (32 t.). Wr ouse facilities. Passenger stati..n only.
64½	103·9	ISPRINGEN	—	Wb (25 t.). SER.
65½	105·9		Tunnel	*c.* 800 m. long.
66½	107·0		—	J (trailing) right, with ST s.o. line to Wildbad (DE line) and Calw. J for ST lines to Stuttgart and Horb.
66½	107·4	PFORNHEIM	—	Wb (40 t.). Cr. (20 t.). SER. ES. W.
69	111·0	EUTINGEN (BADEN)	—	Wb (25 t.). SR. Line bears N.E.
70½	113·1	NIEFERN	—	Wb (40 t.). Cr (10 t.). SER.
72	115·8	ENSBERG	—	Wb (25 t.). SER.
74½	120·0	MÜHLACKER	—	Wb (50 t.). Cr (20 t.). SER. ES. W. Line bears E.
78	125·5	ILLINGEN (WÜRTT)	—	Wb (31 t.). Cr (1·5 t.). SER.
79½	127·7	ENSINGEN	—	Passenger station only.
81	130·5	VAIHINGEN (ENZ)	—	Wb (32 t.). Cr (5 t.). SER.
82½	133·0	SERSHEIM	—	Passenger station only.
84	136·4	GROSSACHSENHEIM	—	Wb (32 t.). Cr (5 t.). SER.
86½	139·2	BIETIGHEIM—METTERZIMMERN	—	Passenger station only.
			Bridge over road	—
88	141·7		Bridge over R. Enz	Line curves S. radius *c.* 450 m.
			Bridge over road	Length 286 m—stone arches, 21 × 13·2 m. spans. J (trailing) left, with DT s.o. line from Heilbronn (Route 77).
89	143·1	BIETIGHEIM (WÜRTT.)	—	Wb (32 t.). Cr (1·5 t.). SER. J (facing), with ST s.o. line to Heutingsheim and Marbach (Route 78).
90½	146·3	TAMM (WÜRTT.)	—	Wb (32 t.). Cr (1·5 t.). SER.
92½	149·0	ASPERG	—	Wb (32 t.). Cr (1·5 t.). SER.
93½	150·8		—	J (trailing), with (left) ST s.o. line from Heutingsheim and Marbach; (right) ST s.o. DE line from Markgroningen.
94½	152·6	LUDWIGSBURG	—	Wb (32 t.). Cr (20 t.). SER.
			—	Line continues 6-track to Stuttgart—electrified from here to München.
95½	153·3		—	J (facing) right to Kornwestheim MY.

Distance from KEHL		Station	Engineering Works	Details and Facilities
Miles	Kms.			
97	156·1	KORNWESTHEIM	—	Halt for personnel only. MY. Wb (32 t.). Cr (9 t.). Capacity 4,000 wagons per 24 hours. ES. W.
97½	157·4	STAMMHEIM (LUDWIGSBURG)	—	Goods station only. Wb (32 t.). SER.
98	157·7		—	J (facing) left, with DT line electrified to Stuttgart—Untertürkheim (Route 76).
			—	Line continues s.o. to Stuttgart (main station).
98½	158·0		Bridge over railway	Line crosses loop from MY to avoiding line.
			—	J (trailing) right, with loop from MY.
			Road overbridge	—
98½	158·6		—	J (facing) left, with DT line to Leonburg (lines removed 1936). J (facing) left to goods yard and branch to Leonburg. Line continues as 6-track.
99½	160·0	STUTTGART—ZUFFENHAUSEN	—	Wb (40 t.). Cr (20 t.). SER. 2 island platforms. 10 DES in goods yard.
100½	161·9	STUTTGART—FEUERBACH	—	Goods station only. Wb (40 t.). Cr (20 t.). SER. Goods shed. 8 DES. *c.* 200 m. long. 3 DES. *c.* 250 m long.
101½	163·0		Tunnel *c.* 700 m long	Line converges to 4-track through tunnel.
			—	J (facing) right to Nord station and DT s.o. line to Rohr.
101½	163·7	STUTTGART-NORD		Goods station. Wb. (40 t.). Cr (12 t.). SR. *E. of branch line—* 19 DES. *c.* 300 m. long. *In J triangle—* ES. Tbl with 6 radial spurs, several LS.
102	164·3		—	J (trailing) right, with DT s.o. line to Horb. *West of branch line—* Rp S—group of 4 DES, with spurs, 493 employees.
103½	166·6	STUTTGART (HAUPTBAHNHOF)	—	Terminus station ; 8 platforms, 16 tracks. *Goods station (W of passenger)—* SER. Cr (30 t.). Wb (40 t.) *c.* 46. DES. *c.* 300–330 m. long. *Carriage Sidings—* 8 DES. *c.* 600 m. long. *Loco. Depot—* Rectangular ES. *c.* 16 roads, 2 tbls, 2 groups of DES, viz. : 8 × *c.* 800 m. long. 12 × *c.* 400 m. long. MY—Untertürkheim (see Route 82), capacity 2,200 per 24 hours.

ROUTE 76

LUDWIGSBURG—STUTTGART (UNTERTÜRKHEIM)

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 13·8 km. (8½ miles).
3. *Track :* 4-track.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Electric and steam.
8. *Maximum distance between stations :* 3·6 km. (2¼ miles).
9. *Marshalling yards (MY) :* KORNWESTHEIM.
   UNTERTÜRKHEIM.
10. *Engine sheds (ES) :* KORNWESTHEIM.
    UNTERTÜRKHEIM.
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (a) Junctions, Engine Sheds, Marshalling Yards, at Kornwestheim and Untertürkheim.
    (b) Bridges and Tunnels referred to in description of line.
13. *Capacity :* 90 trains per day each way, of 500 tons net train load each.

Distance from LUDWIGSBURG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	LUDWIGSBURG	—	Wb. (32 t.). SER. Cr. (20 t.). Terminus of electrified portion.
2½	3·5	KORNWESTHEIM	—	Passenger station for personnel. (MY. ES, see Route 75.)
			Railway overbridge	Line passes under main line to Stuttgart (Hbf.).
4	6·7		Tunnel *c.* 70 m. long	J (trailing) from left with main line to Stuttgart (Hbf.).
4½	7·1	STUTTGART (ZAZENHAUSEN)	—	Passenger halt.
			—	Line continues 4-track.
5	8·0		Tunnel *c.* 150 m. long	—
				J DT (facing) right, to various works along river.
6	9·8	STUTTGART (MÜNSTER)	—	Wb (40 t.). SER. Cr (15 t.). Line continues as DT.
6½	10·4		Wilhelm Viaduct	675 m. long, carries line over R. Neckar, works line and roads.
7½	11·6		Railway overbridge	Line passes under main line Stuttgart—Nürnberg.
				J (trailing) right, to Cannstatt passenger station.
7¾	12·5		—	J (trailing) right, with DT s.o. line München—Cannstatt.
7¾	12·6		Flyover	Line passes under DT line Cannstatt—München.
		STUTTGART—UNTERTÜRKHEIM		MY. Hump, capacity 2,200 wagons per 24 hours. For details, see Route 82.
8½	13·8	STUTTGART—UNTERTÜRKHEIM	—	Passenger station for personnel.
			—	Line here connects with main line Stuttgart—München (Route 82).

ROUTE 77

BIETIGHEIM—HEILBRONN

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 29·2 km. (15 miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No steep gradients, line follows river valley.
6. *Curvature :* Many curves in river valleys.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·4 km. (4 miles).
9. *Marshalling yards (MY) :* HEILBRONN.
10. *Engine Sheds (ES) :* HEILBRONN (HBF.).
11. *Watering facilities :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and Locomotive facilities at HEILBRONN.
    (b) Junctions at BIETIGHEIM and HEILBRONN.
    (c) Bridges—the most important is that over the ENZ at 4·8 km.
13. *Capacity :* 60 trains per day each way, of 450/500 tons net train load each.

Distance from BIETIGHEIM

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	BIETIGHEIM (WÜRTT.)	—	Wb (32 t.). Cr (1·5 t.). SER. J for DT s.o. line Mühlacker—Stuttgart (Route 75).
				Flyover South-West of station.
			—	Line runs in valley of R. Enz.
3	4·8		Bridge over R. Enz	c. 300 m. long
4	6·4	BLEIGHEIM	—	Wb (32 t.). Cr (1·4 t.). SER.
			2 bridges over minor roads	—
			—	Line follows valley of R. Neckar to Heilbronn.
5½	8·7	WALHEIM (WÜRTT.)	—	Cr (2 t.). SR.
7½	11·8	KIRCHHEIM (NECKAR)	—	Wb (32 t.). Cr (10t.). SER.
8½	13·8		Bridge over river	—
9	15·6		—	J (trailing), with ST s.o. dead end line West to Leonbronn (20 km.).
10½	17·1	LAUFFEN (NECKAR)	—	Wb (31 t.). Cr (10 t.). SER.
			Bridge over river	—
14½	23·1	NORDHEIM (WÜRTT.)	—	Wb (31 t.). Cr (1·4 t.). SER. (less than 7 m. long.)
15½	24·6	KLINGENBERG (WÜRTT.)		Restricted goods facilities.
16½	27·2	HEILBRONN—BÖCKINGEN		Passenger station only.
17½	28·4		—	J (trailing) with DT s.o. line South-West to Karlsruhe.
18	29·2	HEILBRONN (main station)	—	J (facing) with line to factory. MY capacity 2,000 wagons. Wb (40 t.). Cr (10 t.). SER. Warehouse.
				ES (roundhouse) small.

ROUTE 76

BIETIGHEIM—BACKNANG—SCHWAB-HALL-HESSENTAL

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 67·8 km. (42 miles).
3. *Track :* Single.
4. *Maximum permissible axle load :*—
   BIETIGHEIM—BEIHINGEN-HEUTINGSHEIM—20 metric tons.
   BEIHINGEN—HEUTINGSHEIM—BACKNANG—17 metric tons.
   BACKNANG—SCHWAB-HALL-HESSENTAL—20 metric tons.
5. *Gradients :* No details available, but as line runs through hilly country from MARBACH to HALL, heavy gradients may be experienced.
6. *Curvature :* No details available, but line winds through valleys of streams.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 6·3 km. (4 miles). (BIETIGHEIM—BEIHINGEN (junction with loop line from LUDWIGSBURG.))
   4·9 km. (3 miles). (BEIHINGEN—HALL Section.)
9. *Marshalling Yards (MY) :* None on route.
10. *Engine Sheds (ES) :* None on route, but locomotive facilities exist at MÜHLACKER (Route 75) and CRAILSHEIM (Route 74).
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Junctions at BIETIGHEIM, MARBACH and HALL.
    (b) Bridges and tunnels on route, see description of line.
13. *Capacity :* 20 trains per day each way, of 300/350 tons net train load each.

Distances from BIETIGHEIM

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	BIETIGHEIM (WURTT.)	—	Wb (32 t.). Cr (1·5 t.). SER. J, with main routes from west to Stuttgart, Ulm, Augsburg and München (see Routes 75 and 82).
½	1·2		Railway overbridge carrying DT s.o. line to Ludwigsburg	—
			Road overbridge	—
4	6·3	BEIHINGEN—HEUTINGSHEIM	—	Wb (32 t.). Cr (2 t.). SER. J (trailing) right, with loop from Ludwigsburg. DT s.o. line from Ludwigsburg to Favoritepark (2·5 km.) and ST s.o. from Favoritepark to Heutingsheim (2·6 km.).
			Bridge over road	—
6½	10·5	BENNINGEN (NECKAR)	—	Restricted goods facilities.
7	11·1		Viaduct over R. Neckar and over road	— c. 200 m.
7½	12·0	MARBACH (NECKAR)	—	Wb (30 t.). Cr (3 t.). SER. Line follows R. Murr valley to Fichtenberg, and then follows R. Rot valley.
9	14·7	ERDMANNHAUSEN—MÖLINGSHAUSEN	—	Restricted goods facilities.
11½	17·1	KIRCHBERG (MURR)	—	Wb (32 t.). Cr (2 t.). SER.
12	19·4		Road overbridge	—
			Bridge over stream (Buchen)	—
12	20·9	BURGSTALL (MURR)	—	Wb (32 t.). Cr (1·6 t.). SER.
15	24·2		Bridge over stream	—
15½	25·0		—	Line runs parallel with ST s.o. line from Waiblingen to Backnang.

Distance from BIETIGHEIM *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
16	25·7	BACKNANG	—	Wb (40 t.). Cr (20 t.). SER. Terminus for ST a.o. line from Waiblingen (continuing DT to Stuttgart).
16½	26·3		Bridge over road	—
17½	27·9	BACKNANG STRINKEN	—	Passenger halt. Line turns N. to Sulbach.
18½	29·5	STEINBACH	—	Passenger station only.
20	32·0	REICHENBERG (MURR)	—	Wb (32 t.). Cr (1·6 t.). SER.
22	35·5	SULZBACH (MURR)	—	Wb (32 t.). Cr (2 t.). SER. Line turns E. to Mittelrot.
24	38·5	SCHLEGELWEILER	—	Passenger halt.
25	40·3		Bridge over R. Murr	—
26	41·7	MURRHARDT	—	Wb (32 t.). Cr (2 t.). SER.
			Bridge over stream	—
28½	46·4	FORNBACH	—	Wb (32 t.). Cr (1·6 t.). SER.
29	46·9		Bridge over main arterial road	—
29½	47·4		Bridge over main arterial road	—
30½	49·3		Tunnel	858 m. long.
31½	50·9		Bridge over R. Kot and road	—
31½	51·3	FICHTENBERG	—	Wb (32 t.). SER. Cr (1·6 t.).
33½	54·0	MITTELROT	Several bridges over streams	Passenger halt.
			—	Line turns N. to Hall.
34½	55·6		Tunnel	c. 400 m. long.
			—	J (trailing) right, with ST a.o. line from Groningen (19 km.).
35	56·3	GAILDORF REICHEN.	—	Wb (32 t.). SER. Cr (2 t.).
			Bridge over R. Kocher	—
36½	59·3	OTTENDORF (KOCHER)	—	Restricted goods facilities.
39½	63·8	WILHELMSGLÜCK	—	Wb (40 t.). SER. Cr (1·6 t.).
40½	65·8		—	Line joins DT a.o. line from Heilbronn (Route 74).
42	67·8	SCHWAB-HALL-HESSENTAL	—	Wb (32 t.). ER. Cr (2·6 t.). J (trailing) left, DT a.o. from Nevenstein (27·3 km.).

Junction with main route from West to NÜRNBERG (Route 74).

ROUTE 79

STUTTGART (BAD-CANNSTATT)—AALEN—GOLDSHÖFE—NÖRDLINGEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 115·5 km. (71¾ miles).
3. *Track :* Double. 78·8 km. (STUTTGART—GOLDSHÖFE.)
   Single. 32·7 km. (GOLDSHÖFE—NÖRDLINGEN.)
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, but route follows valleys of REMS, KOCHER, JAGST and EGER for greater part of the way. Only variation from flat contour is when line rises to 800 m. at 66·4 km. (watershed of REMS and KOCHER). Tunnel through RHINE—DANUBE watershed at 91·9.
6. *Curvature :* No details available, but line follows winding course of river valleys.
7. *Traction :* Steam.
8. *Maximum distance between stations :* Double track, 6·2 km. (3⅞ miles).
   Single track, 4·9 km. (3 miles).
9. *Marshalling Yards (MY) :* STUTTGART (UNTERTÜRKHEIM).
10. *Engine Sheds (ES) :* AALEN, NÖRDLINGEN, STUTTGART.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities referred to in paras. 9 and 10.
    (b) Junctions at STUTTGART, SCHWÄB GMÜND, AALEN, GOLDSHÖFE and NÖRDLINGEN.
    (c) Bridges over rivers on route.
    (d) Tunnel at RÖTTINGEN.
13. *Capacity :* To GOLDSHÖFE 60 trains per day each way } of 400/450 tons net
    Onwards from GOLDSHÖFE 24 „ „ „ „ „ } train load each.

Distances from STUTTGART—BAD-CANNSTATT

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	STUTTGART (BAD-CANNSTATT) (219 m.)	—	Wb (50 t.). Cr (30 t.). SER. Customs office. Warehouse. E.S.
			—	(MY at Untertürkheim capacity 2,300 wagons per 24 hours).
			Bridge over road	—
			Bridge over railway	DT electrically operated line from Esslingen.
			Bridge over railway line and 2 roads	DT electrically operated line Esslingen—Ludwigsburg.
			—	⅃ (trailing), with loop from Esslingen—Ludwigsburg line.
			Bridge over road	—
3⅞	6·2	FELLBACH	—	Wb (40 t.). Cr (15 t.). SER.
			Bridge over road	—
				(West of Waiblingen station.) ⅂ (facing) with ST s.o. line N.E. to Michelbach.
5⅛	8·6	WAIBLINGEN	—	Wb (40 t.). SER. Customs office.
				Line runs in the valley of the R. Rems to Esslingen.
			Bridge over road	—
6¼	10·4	ROMMELSHAUSEN	—	Passenger station only.
			Bridge over road	—
8	13·0	STETTEN	—	Passenger station only.
			2 bridges over road	—
9	14·4	ENDERSBACH	—	Wb (32 t.). Cr (1·6 t.). SER.
9¼	15·6	BEUTELSBACH	—	Passenger station only.
			Bridge over minor road	—
			Bridge over stream	—
11¼	18·1	GRUNBACH	—	Wb (32 t.). Cr (1·2 t.). SER.

Distance from STUTTGART—BAD-CANNSTATT

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
12½	19·7	GERADSTETTEN	—	Passenger station only.
			Bridge over minor road	—
14	22·8	WINTERBACH (G. SCHORNDORF)	—	Wb (32 t.). Cr (1·4 t.). SER.
			Bridge over minor road	—
15	24·4	WEILER (REMS)	—	Passenger halt.
			Bridges over several minor roads	—
16½	26·4	SCHORNDORF (256 m.)	—	Wb (32 t.). Cr (4 t.). SER.
			Bridge over minor road	—
			—	J (facing,)with ST s.o. DE line to Welzheim (23 kms.).
			Bridge over road and over R Rems	—
			Bridge over stream	—
			Bridge over minor road	—
18½	30·0	URBACH (G. SCHORNDORF)	—	Wb (42 t.). Cr (1·4 t.). ER.
19½	31·9	PLÜDERHAUSEN	—	Wb (32 t.). Cr (1·2 t.) SER.
			Several bridges over minor roads	—
22	35·4	WALDHAUSEN (G. SCHORNDORF)	—	Wb (32 t.). SER.
			Several bridges over roads	—
24½	39·9	LORCH (WÜRTT). (274 m.)	—	Wb (32 t.). Cr (1·5 t.). SER.
			—	
27½	43·9	DEINBACH	—	Passenger station only.
			Bridge over minor road	—
28½	47·5	SCHWÄB GMÜND (321 m.)	—	Wb (32 t.). Cr (10 t.). SER. Customs office. Warehouse.
			Several bridges over minor roads	—
32½	52·6	HOHENHOFEN	—	Restricted goods facilities.
			Bridge over stream	—
35½	56·9		—	J (facing), with ST s.o. DE line running S.E. to Heubach.
35½	57·3	UNTERBÖBINGEN	—	Wb (32 t.). Cr (1·2 t.). SER.
			2 bridges over road	—
37½	60·8	MÖGGLINGEN (G. GMÜND)	—	Wb (32 t.). Cr (1·7 t.). SER.
			Bridge over minor road	—
41½	66·4	ESSINGEN (BEI AALEN) (483 m.)	—	Wb (41 t.). Cr (1·5 t.). SER. Line crosses the watershed between the Rems and Kocher rivers and drops down into the valley of the R. Kocher.
			Bridge over road	—
			Bridge over R. Kocher	—
			Flyover	Carries line over ST s.o. branch from Ulm.
44½	72·2	AALEN (433 m.)	—	Wb (50 t.). Cr (20 t.). SER. ES.
				J (trailing), with ST s.o. line from Ulm.

Distance from STUTTGART—BAD-CANNSTATT

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
46	74·2	WASSERALFINGEN	—	Wb (30 t.). ER. Exchange facilities with light railway S.E. to Dillingen (56 km.). Line leaves valley of R. Kocher.
			Bridge over road	—
47½	76·0	HOFEN	—	Passenger halt.
49	78·8	GOLDSHÖFE	—	Wb (32 t.). Cr (13·5 t.). SER. DT portion ends and the remainder of the route to Nördlingen is ST. J (facing) with ST s.o. line to Crailsheim (Route 81). Line enters valley of the R. Jagst.
50½	81·5	FRANKENREUTE	—	Passenger halt.
52	83·9	WESTHAUSEN (464 m.)	—	Wb (25 t.). Cr (1·3 t.). SER.
52½	84·6		Bridge over road	—
55	88·2	LAUCHHEIM (516 m.)	—	Wb (32 t.). Cr (2·8 t.). SER.
57	91·9	RÜTTINGEN (WURTT.)	—	Passenger station only.
			Tunnel	c. 600 m. long. Line pierces watershed between Rhine and Danube by this tunnel and enters valley of R. Eger.
59½	95·9	AUFHAUSEN (WURTT.)	—	Passenger station only.
61½	99·1	BOPFINGEN (457 m.)	—	Wb (32 t.). Cr (2·8 t.). SER.
64½	103·6	TROCHTELFINGEN (G. BOPFINGEN)	—	Restricted goods facilities.
			Bridge over R. Eger	—
66	106·5	PFLAUMLOCH	—	Wb (32 t.). Cr (1·2 t.). SER.
68½	110·4		Bridge over R. Eger	—
69	111·2		—	J (trailing), with ST s.o. lines from Dombühl and Günsenhausen (Routes 91 and 89 respectively.)
			Bridge over road	—
69½	111·5	NÖRDLINGEN (430 m.)	—	Wb (40 t.). SER. ES

ROUTE 80

LAUTERBOURG—WÖRTH

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 12·4 km. (7¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 16 tons (LAUTERBOURG—BERG).
   20 tons (BERG—WÖRTH).
5. *Gradients :* No details available, but not expected to be severe.
6. *Curvature :* No details available, but not expected to be severe.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 4·5 km (2¾ miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine sheds (ES) :* None.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :* Junctions at LAUTERBOURG and BERG.
13. *Capacity :* 60 trains per day each way, of 400/450 tons net train load each.

Distance from LAUTERBOURG Miles	Kms.	Station	Engineering Works	Details and Facilities
0	0		—	Line is a continuation of DT s.o. line from Strasbourg—distance 56·8 km (34¾ miles).
0	0	LAUTERBOURG	—	SER. Wb. Cr. Line runs N.E. along Rhine valley. J (facing) left, with branch line to Wissembourg.
1¼	2·3		—	Frontier.
1¾	2·8	BERG	—	SR. Wb (35 t.).
3	5·0	NEUBURG (RHEIN)	—	SER.
5	7·9	HAGENBACH	—	SER. Wb (40 t.). Cr (5 t.).
7	11·1		—	J (trailing) right, with DT s.o. line from Karlsruhe (Route 66).
7¾	12·4	WORTH	—	SER. Wb (70 t.). Cr (2 t.). Line continues N. to Germersheim as Route 66. J (left), with ST s.o. line to Winden. (Route 71.)

ROUTE 81

GOLDSHÖFE—CRAILSHEIM

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 30·5 km. (19 miles).
3. *Track :* Single.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available, line follows river valleys.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 4·5 km. (2¾ miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine sheds (ES) :* CRAILSHEIM.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Locomotive facilities at CRAILSHEIM.
    (b) Junctions at GOLDSHÖFE and CRAILSHEIM.
13. *Capacity :* 24 trains per day each way, of 400 tons net train load each.

Distance from GOLDSHÖFE

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	GOLDSHÖFE	—	Wb (32 t.). SER. Cr (1·3 t.). J. S. of station, with ST s.o. line from Nördlingen (32·7 km.).
1¼	2·3		Bridge over tributary of R. Jagst	—
2¾	3·7	SCHWABSBERG	—	Wb (25 t.). SER. Follows W. bank of R. Jagst in hilly country.
4	6·3		Bridge over tributary of R. Jagst	—
4¼	7·2	SCHREIHEIM	—	Passenger halt.
4¾	7·7		Bridge over R. Jagst	—
5¾	9·1	ELLWANGEN	—	Wb (32 t.). SER. Cr (2·6 t.).
6¼	10·6		2 bridges over R. Jagst	—
8	13·0	SCHÖNAU	—	Passenger halt.
9¾	15·8	SCHWEIGHAUSEN	—	Passenger halt.
			Bridge over R. Jagst	—
10¾	17·4		Bridge over road	—
11	17·8	JAGSTZELL	—	Wb (32 t.). SER. Cr (1·8 t.). Valley broadens out from here to Jagstheim.
13	21·2	STIMPFACH	—	Wb (32 t.). SER. Cr. (2 t.).
14¼	23·6	STEINBACH (JAGST)	—	Passenger halt.
			2 bridges over tributaries of R. Jagst	—
15¼	25·2	JAGSTHEIM	—	Wb (40 t.). SER. Cr (2 t.).
			Bridge over tributary of R. Jagst	Hilly section from here almost to Crailsheim.
			Bridge over tributary of R. Jagst	
18¼	29·7		Railway overbridge	Carrying DT s.o. line from Schwab-Hall-Hessental. J (trailing) left, connecting with Schwab-Hall-Hessental line.
19	30·5	CRAILSHEIM	—	Wb (40 t.). SER. Cr. (1·0 t.). ES.

ROUTE 82

STUTTGART—ULM—GÜNZBURG—AUGSBURG—MÜNCHEN

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 240·3 km (149½ miles).
3. *Track :* 13·2 km—Multiple STUTTGART—ESSLINGEN.
   214·6 km—Double ESSLINGEN—LOCHHAUSEN.
   8 km.—8-track LOCHHAUSEN—MÜNCHEN.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* Seven gradients up to 22 per mille (1 in 45) on the so-called "Geislingen Steige," a 6 km. section between GEISLINGEN and AMSTETTEN.
6. *Curvature :* Details of curves (measured on 1/100,000 map) see itinerary at 58·6, 94·1, 146·0 and 174·8 kms.—no other details available.
7. *Traction :* Electric and steam—line is electrified throughout.
8. *Maximum distance between stations :* 6·3 km (WESTERSTETTEN—BEIMERSTETTEN).
9. *Marshalling Yards (MY) :* AUGSBURG, NEU ULM, LAIM (MÜNCHEN), MÜNCHEN (OST), STUTTGART—UNTERTÜRKHEIM.
10. *Engine Sheds (ES) :* STUTTGART, AUGSBURG, GEISLINGEN, NEU ULM, PLOCHINGEN, MÜNCHEN (Main Station)—probably removed to MÜNCHEN PASING, MÜNCHEN OST, ULM (HBF), ULM (RBF).
11. *Watering facilities (W) :* STUTTGART, ULM, AUGSBURG, MÜNCHEN. No other details available.
12. *Electric Sub-stations :* MÜNCHEN PASING, MERITINGEN (N. of AUSBURG—Route 88), NEU ULM, STUTTGART.
13. *Vulnerable points :*
    (a) Marshalling and locomotive facilities referred to in paras 9 and 10.
    (b) Electric Sub-stations referred to in para. 12.
    (c) Junctions at STUTTGART, PLOCHINGEN, ULM, NEOFFINGEN, AUGSBURG and MÜNCHEN.
    (d) Bridges on route—the most important being at ULM (over DANUBE) and over the autobahn at 112·1 and 134·6 km.
14. *Capacity :* 72 trains per day each way, of 300/350 tons net train load each (throughout capacity).

Distance from STUTTGART

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	STUTTGART	—	Main station terminus.
				16 tracks, *c.* 8 platforms.
				Electric sub-station.
				Goods Station W. of passenger station.
				SER. Cr (30 t.). Wb (40 t.). *c.* 46. DES. *c.* 300—550 m.
				Carriage Sidings.
				c. 8 DES. *c.* 600 m.
				Loco. Depot. ES. rectangular.
				c. 16 roads.
				2 Tbls. W.
				2 groups DES 8×*c.* 800 m. 12×*c.* 400 m.
				4 tracks.
				Electrified line.
			Tunnel	340 m. long. 3 tracks.
2	3·2		Bridge over R. Neckar	323 m. long.
2	3·4	STUTTGART—BAD-CANNSTATT	—	SER. Wb (40 t.). Cr (30 t.). Passenger station.
				5 platforms (3 island).
				8 tracks.
				Rp S (1,103 employees).
2½	3·9		Flyover	Up line passes under DT Up line from Nürnberg.
				J (converging).
				(1) DT line to Nürnberg.
				(2) DT line to München.
				(3) DT line from München.
				(4) ST line to Rp S.
2¾	4·4		Flyover	Down DT line passes under Nürnberg line (4 track).
				J (trailing) right, from Down line to Rp S.

Distances from Stuttgart				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
				J (facing) from Up line to goods station.
3½	5·5		Flyover	Down line passes under Up line.
				J (trailing) left to (1) DT avoiding line (Route 76). (2) MY.
4½	6·9	Stuttgart—Untertürkheim	—	MY—hump. c. 6 LS c. 450 m. c. 12 LS c. 850 m. Capacity 2,200 wagons per 24 hours.
				Passenger station. 3 platforms (2 island). 6 tracks.
				Line continues 6-track along bank of R. Neckar.
			Road overbridge	—
5½	9·3	Stuttgart—Obertürkheim	—	Wb (32 t.). Cr (20 t.). SER.
			Road overbridge	—
6½	11·0	Esslingen—Mettingen	—	Passenger station only. Rp S.
			Road overbridge	—
8	13·2	Esslingen (Neckar)	—	Wb (32 t.). SER. Cr. (20 t.). End of 4-track section. Beginning of DT track.
9½	15·3	Oberesslingen	—	Halt.
11	17·9	Zell	—	Passenger station only.
12	19·4	Altbach	—	Wb (32 t.)
			Bridge over road	—
13½	22·2	Plochingen	—	Wb (32 t.). Cr (5 t.). SER. ES.
			Road overbridge	Line passes under main road.
14½	23·2		—	J (facing) right, with line to DT electrified line to Tübingen.
				Line to Ulm continues along bank of R. Fils to Geislingen.
			Bridge over tributary of R. Fils	—
16½	26·6	Reichenbach (Fils)	—	Wb (32 t.). SER. Cr (1·5 t.).
			Road overbridge	—
			Line crosses three tributaries of R. Fils	—
19½	31·3	Eberbach (Fils)	—	Wb (32 t.). SER. Cr (1·5 t.).
21	33·8		Bridge over road and R. Nassach (tributary of R. Fils)	—
22½	36·0	Uhingen	—	Wb (32 t.). SER. Cr (1·5 t.).
23½	38·4	Faurndau	—	Passenger halt.
24½	39·0		Road overbridge	Line passes under main road.
				J (trailing) left, with ST s.o. line to Gmünd, on DT line Stuttgart—Aalen.
			Road overbridge	—
25½	41·4	Göppingen	—	Wb (51 t.). SER. Cr (30 t.). Bonded warehouse.
			Road overbridge	—
				J (facing) right, with ST DE line to Boll.

Distance from STUTTGART		*Station*	*Engineering Works*	*Details and Facilities*
Miles	*Kms.*			
28½	45·5	EISLINGEN (FILS)	—	Wb (32 t.). SER.
			Bridge over road	—
29½	47·9	SALACH	—	Passenger station only.
			Bridge over road	—
31	49·5	SÜSSEN	—	—
			Road overbridge	Railway passes under main road.
31½	50·3		—	J (facing) left, with ST s.o. DE line to Weissenstein.
				Line turns S.
33	53·0	GINGEN (FILS)	—	Wb (40 t.). SER. Cr (2 t.).
34	54·9		Bridge over stream (tributary of Fils)	—
34½	55·6	KUCHEN	—	Restricted goods facilities.
35½	57·3	GEISLINGEN WEST	—	Halt. ES.
			Bridge over tributary of Fils (Langental)	—
				Railway curves N... and S. round outskirts of town.
				Curve *c.* 400 m. radius.
				Length *c.* 600 m. (taken from map).
				Line runs S. along valley and parallel to ST s.o. line from Wiesensteig.
36½	58·6		Bridge over main road	—
			Bridge over stream Eyb	—
37½	60·6	GEISLINGEN (STEIGE)	—	Wb (32 t.). Cr (12 t.). ER. Terminus of ST line to Wiesensteig, also of narrow gauge railway running S. parallel with main line to Amstetten, where it branches W. to Laichingen.
40½	65·0		Road overbridge	Railway passe under main road.
41½	66·4	AMSTETTEN	—	Wb (32 t.). SER. Exchange facilities with light railway to Laichingen.
			Railway crosses two minor roads	—
			—	J with ST s.o. line to Gerstetten.
43½	69·9		Bridge over main road	—
43½	70·3	URSPRING	—	Restricted goods facilities.
44½	72·0		Bridge over road	—
44½	72·2	LONSEE	—	Wb (40 t.). Cr (2 t.). SR.
45	72·4		Line crosses main road to Bernstadt	Line runs parallel to main road.
45½	73·6		Bridge over road	—
46½	74·6		Bridge over main road	—
46½	75·3	WESTERSTETTEN	—	Wb (32 t.). Cr (2 t.). SER (small)
			Bridge over stream (Lone)	—
47	75·7		Bridge over main road	—
47½	76·8		Bridge over road	—
50	80·7		2 bridges over roads	—
50½	81·3	BRIMERSTETTEN	—	Wb (32 t.). Cr (2 t.). SER.
51½	82·8		Cutting	—
52	84·0		Embankment	Line runs on embankment to Ulm.
				Line curves E.

Distances from STUTTGART

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
53	85·3	JUNGINGEN	—	Restricted goods facilities.
				Line curves S.E.
				Line curves S.W.
			Road overbridge	—
54½	87·7		—	J (trailing) from left, with ST s.o. line to Aalen.
			Bridge over railway	Line passes over ST loop connecting Aalen branch to ST line to Schelklingen and Sigmaringen.
			Road overbridge	—
				J (trailing) right, with ST s.o. line to Schelklingen.
			Road overbridge	—
58	93·3	ULM	—	Main station.
				Wb (40 t.). Cr (20 t.).
				Loco. Depot. ES 2 roundhouses (medium). Tbl. W. Workshop attached.
				Terminus for— (1) ST s.o. line to Aalen. (2) ST s.o. line to Schelklingen and Sigmaringen.
			Bridge over road	—
				SY *c.* 8 LS adjoining loco. depot, apparently for traffic on ST line to Schelklingen.
				For air photographs of Ulm and Neu Ulm, see Appendix 3.
58½	94·1		—	J (facing), with DT s.o. line to Friedrichstein.
			Bridge over R. Donau (Danube)	Length *c.* 150 m. 5 spans × *c.* 20 m., also 2 side spans.
			Bridge over road	Line curves N.E. Radius *c.* 1,100 m. (taken from map).
			Bridge over road	—
59½	96·1	NEU ULM	—	SER. Wb (40 t.). Cr (10 t.).
				Loco. Depot. 2 ES (medium) in junction triangle. Workshop attached.
			Bridge over road	Electric sub-station.
				MY (capacity 2,400 wagons per 24 hours).
				Loco. depot. 3 ES roundhouse (large).
				2 groups of LS (18 and 6 respectively).
				West-end of MY transhipment sheds and goods yard.
				Several DES with road access.
				RpS.
				For air photograph, see Appendix 3.
(60½	97·4		—	J (facing) right, with DT s.o. line to— (1) Weissenhorn. (2) Memmingen.
				Line curves E.
				Line curves. NE.
62	99·8		Road overbridge	—

Distance from STUTTGART		Station	Engineering Works	Details and Facilities
Miles	Kms.			
62½	100·9	BURLAFINGEN	—	Passenger station only. Facilities for loading sheep, etc.
			Bridge over road	Line passes over main road Ulm—Günsburg.
64⅛	104·3		Bridge over road	—
64⅜	104·8		Bridge over road	—
65	105·2	MERAINGEN (alt. 450 m.)	—	SER. Wb (40 t.).
			Bridge over tributary of R. Donau (Danube)	—
				Line turns E.
67½	108·3	UNTERFAHLHEIM	—	Passenger station. Facilities for loading sheep, &c.
68⅛	110·1		Bridge over tributary of R. Donau (Danube)	—
				Line runs along left bank of R. Donau (Danube) on embankment.
			—	Line turns N.E. to Offingen.
69⅛	111·4			—
69½	112·1		Line crosses autobahn (Stuttgart—München)	
70	112·8	LEIPHEIM (alt. 450 m.)	—	Wb (40 t.). SER.
72½	116·8		—	J (trailing), from right with ST. s.o. line to Mindelheim.
72⅝	117·2		Bridge over R. Günz	—
73⅛	117·9	GÜNZBURG (alt. 446 m.)	—	For air photograph, see Appendix 6. SER. Wb (40 t.).
			Road overbridge	Line passes under main road from Dillingen.
73⅝	118·6		Bridge over road	—
75⅛	121·7	(alt. 439)	—	—
76⅛	123·5	NEUOFFINGEN	—	SER. Wb (30 t.).
76⅜	123·7		—	J (facing) left, ST s.o. line to Donauworth.
				Line leaves R. Donau (Danube) and turns S.E.
			Bridge over road	—
			Bridge over R. Murde	—
77⅛	124·9		Bridge over road	—
78⅛	126·2	OFFINGEN (alt. 439 m.)	—	Wb (40 t.). SER. Cr (75 t.)
			Bridge over road	—
80⅛	129·9	MINDELALTHEIM (alt. 448 m.)	—	Passenger station with restricted goods facilities only.
81⅛	131·5		Bridge over stream	—
			Bridge over arterial road (Knoringen—Augsburg)	—
83	133·7	BURGAU (alt. 457 m.)	—	SER. Wb (40 t.). Cr (·75 t.)
			Embankment	Line runs on embankment to Jettingen.
83⅛	134·6		Bridge over autobahn (Stuttgart—München)	—
85	136·9	JETTINGEN (alt. 472 m.)	—	SER. Wb (40 t.). Cr (1·5 t.)
				Line turns in easterly direction.
87⅛	140·7		—	Line curves S.E.
88	141·7	FREIHALDEN	—	Passenger traffic only. Facilities for loading livestock.
			Embankment	For 3·7 km.
88⅛	143·0		—	Line curves E.
			Road overbridge	—
90⅛	146·0	GABELBACH	—	SER. Wb (40 t.). Cr (1·5 t.).
			Bridge over road	—
				Line turns S., curve c. 900 m.
			3 bridges over roads	—

Distances from STUTTGART Miles	Kms.	Stations	Engineering Works	Details and Facilities
94	151·5	DINKELSCHERBEN (alt. 461 m.)	—	SER. Wb (40 t.). Cr (9 t.).
				J (facing) right, with ST s.o. line to Thannhausen.
				Line bears E.
97½	156·6	MÖDINGHOFEN (alt. 479 m.)	—	—
				Line bears N.E.
99	159·6	KUTZENHAUSEN	—	Halt.
99½	159·9		—	Line bears E.
101	162·5		—	J (trailing) from right, with ST s.o. line from Mindelheim, via Türkheim.
			Bridge over road	—
101	162·8	GESSERTSHAUSEN (alt. 477 m.)	—	SER. Wb (40 t.). Cr (1·5 t.).
				Line turns N.E.
			Bridge over river	
103½	167·0	DIEDORF (alt. 484 m.)	—	SER. Wb (40 t.).
105	169·2	BIBURG	—	Halt.
			Bridge over arterial road to Augsburg	
105½	169·9		Bridge over road	—
			Bridge over road	—
106½	171·5	WESTHEIM	—	SER. Wb (30 t.).
107	172·4		—	J (trailing) from left ST s.o. line to Welden.
				Line bears E.
			Bridge over road	—
107½	173·2	NEUSÄSS (alt. 481 m.)	—	Passenger traffic only.
108½	174·8		Road overbridge	—
				Line curves S. Curve *c.* 650 m.
109	175·7		Bridge over railway	Line passes under DT line Nürnberg—Augsburg (electrified—see Routes 85 and 87).
109	175·7	AUGSBURG—OBERHAUSEN		Wb (40 t.). Cr (12 t.). SER.
110½	177·9	AUGSBURG (main station)	—	5 passenger platforms (4 island).
				Electric sub-station at Mettingen (Route 85).
				Goods Station E. of line.
				SER. Wb (40 t.). Cr (15 t.).
				3 separate yards leading S. to N.
				(1) *c.* 16 DES with road access.
				(2) 4 DES with road access.
				6 DES serving 2 transhipsheds.
				(3) 22 DES with road access *c.* 4 DES serving 2 transhipsheds.
				MY. W. of line, capacity 2,300 per 24 hours—hump.
				Loco. Depot 2 ES (large)—roundhouse type. Tbl. W.
				Several DES in yard, workshops attached.
				RpS adjoining loco. depot.
				For air photograph of Augsburg, see Appendix 12.
			Bridge over R. Lech	Length 125 m.—3 spans; 1 × 91 m.; 2 × 8·2 m.
103½	182·7	AUGSBURG—HOCHZOLL	—	MY—capacity 2,300 wagons per 24 hours.
				Wb (30 t.). SER.
				J (facing) left, with DT s.o. line to Ingoldstadt.
				Line turns S. and runs parallel with main road to Mering.

Distance from STUTTGART Miles	Kms.	Station	Engineering Works	Details and Facilities
116½	187·8	KISSING (alt. 498 m.)	—	Wb (30 t.). SER.
			Bridge over stream (tributary of Donau)	
120½	193·7	MERING	—	Wb (40 t.). SER. J (facing) right, with ST s.o. line to Weilheim. Line curves S.E. to Haspelmoor.
124½	200·0	ALTHEGNENBERG	—	Wb (30 t.). SR
			Bridge over road	—
126	203·1	HASPELMOOR (alt. 542 m.)	—	Wb (40 t.). SER.
127½	204·8		—	Line bears E.
128	206·2		Bridge over main road	—
129½	208·8	NANNHOFEN (alt. 529 m.)	—	Wb (30 t.). SER.
131½	212·2	MALCHING	—	Passenger halt.
133½	215·5	MAISACH (alt. 515 m.)	—	Wb. (30 t.). SER.
135	217·3		Bridge over minor road	—
135½	218·7	GERNLINDEN	—	Restricted goods facilities.
136½	220·1		Bridge over minor road	—
137	220·5		Bridge over R. Amper	—
137½	221·1	OLCHING	—	Wb (40 t.). SER. Line crosses several streams—tributaries of R. Amber.
139½	224·6	GRÖBENZELL	—	—
			Bridge over R. Gröben	—
140½	226·4		Bridge over R. Erl	—
			Bridge over road	—
141½	227·8	LOCHHAUSEN (alt. 514·5 m.)	—	Wb (33 t.). SER.
144½	232·3		—	J (trailing) from right with— (1) DT s.o. line from Buchloe. (2) 4-track electrified from— (a) Herrsching (ST electric) (b) Gauting (DT electric) (c) Tutzing (DT electric). Line continues 8-track to München.
144½	232·9	MÜNCHEN—PASING	—	Electric sub-station. SER. Wb (40 t.). Cr (5 t.). J (facing) left, to goods yard. J (trailing) right to gas works. J (trailing) left, with DT electrified line to Landshut.
145½	234·7		Flyover	Line passes over 4-track line from— (1) Landshut (DT) electrified. (2) Ingolstadt (DT) (Route 87).
147	236·7		—	J (facing) left, with Laim MY. J (facing) right, with DT electrified line to München (South), Salzburg and Innsbruck.
149½	240·3	MÜNCHEN (main station)	—	Wb (30 t.). Cr (25 t.). SER. MY (Laim)—capacity 2,900 wagons per 24 hours; Ost—capacity 2,000 wagons per 24 hours. RpS (2,340 employees). ES (4 roundhouse). ES at München Ost.

ROUTE 83·

ULM—AALEN

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 72·5 km (45 miles.)
3. *Track :* Single.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 5·5 kms (3½ miles).
9. *Marshalling yards (MY) :* Neu Ulm.
10. *Engine sheds (ES) :* Ulm, Aalen.
11. *Watering facilities (W) :* Ulm, Aalen.
12. *Vulnerable points :*
    (a) Marshalling Yards and Locomotive facilities at Ulm and Aalen.
    (b) Junctions at 29·9 km. and Aalen.
13. *Capacity :* 20 trains per day each way, of 300/400 tons net train load each.

Distance from Ulm

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	Ulm (main station)	—	Wb (40 t.). Cr (20 t.). SER. Warehouse.
				Loco. Depot—2 ES. roundhouse (medium). Tbl. with workshop attached.
				MY at Neu Ulm—capacity 2,400 wagons per 24 hours, also loco. facilities.
				J (trailing), with ST s.o. line S.W. to Sigmaringen.
				For air photograph of Ulm, see Appendix 3.
			Railway bridge over line	Carrying DT electrically operated line N.W. to Stuttgart.
1	1·5	Ulm Ost	—	Passenger station only.
				J (facing), with works siding.
4	6·6	Thalfingen (Bei Ulm)	—	Restricted goods facilities.
			Bridge over minor road	—
6	9·6	Oberelchingen (Bayern)	—	Passenger halt.
			Bridge over minor road	—
6½	10·9	Unterelchingen (Bayern)	—	Wb (26 t.). Cr (1·6 t.). ER.
			2 small bridges	
10	16·1	Langenau (Württ.) (460 m.)	—	Wb (31 t.). Cr (2 t.). SER.
			Several bridges over roads and tracks	—
13½	21·4	Rammingen	—	Wb (25 t.). Cr (1·6 t.). SER.
			Bridge over road	—
16	25·6	Niederstotzingen	—	Wb (32 t.). Cr (1·6 t.). SER.
			2 bridges over roads	—
18½	29·9		—	J (trailing), with ST s.o. line running E. to join with Ulm—Donauworth line.
19	30·7	Sontheim—Brenz	—	Wb (32 t.). Cr (1·6 t.). ER. Line follows valley of R. Brenz as far as Königsbronn.
			3 bridges over small roads	—

Distance from Ulm				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
20½	32·8	BERGENWEILER	—	Passenger halt.
			2 bridges over minor roads	—
21½	34·3		Bridge over tributary of R. Brenz	—
21⅞	35·1	HERMARINGEN (457 m.)	—	Wb (26 t.). Cr (1·8 t.). ER.
			4 bridges over roads	—
24	38·8	GIENGEN (BRENZ) (466 m.)	—	Wb (40 t.). SER.
			Bridge over road	—
27	43·4		Bridge over R. Brenz	—
			Bridge over minor road	—
27⅞	44·0	HERBRECHTINGEN	—	Wb (32 t.). Cr (2 t.). ER.
27⅞	44·7	BOLHEIM	—	Passenger halt.
29⅞	47·8	HEIDENHEIM—MERGELSTETTEN	—	Wb (32 t.). ER.
			Several bridges over minor roads	—
31⅛	50·4	HEIDENHEIM (494 m.)	—	Wb (40 t.). Cr (25 t.). SER. Customs Office. Warehouse.
			Bridge over R. Brenz in Heidenheim	—
			2 bridges over minor roads	—
33⅛	53·6	HEIDENHEIM—SCHNAITHEIM	—	Wb (32 t.). Cr (1·6 t.). SER.
			Bridge over minor road	
			Short tunnel	—
35⅛	56·9	ITTELSBERG	—	Passenger station only.
			Bridge over minor road	—
36	58·0		Bridge over R. Brenz	—
36⅛	58·6	KÖNIGSBRONN (501 m.)	—	Wb (32 t.). Cr (2·4 t.). SER.
			3 bridges over minor roads	—
39⅝	64·2	OBERKOCHEN	—	Wb (40 t.). Cr (1·5 t.). SER.
			Bridge over road	—
42⅛	68·6	UNTERKOCHEN	—	Wb (40 t.). Cr (1·6 t.). SER.
			Bridge over road	—
45	72·5	AALEN	—	Wb (50 t.). Cr (20 t.). SER. Customs Office. ES. Junction station.
			—	J (trailing), with DT s.o. line from Stuttgart.
			—	N. of station. J (trailing), with light railway S.E. to Dillingen (5·6 km.).

ROUTE 84.

INGOLSTADT—GÜNZBURG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 102·2 km. (63½ miles).
3. *Track :* Single to NEOFFINGEN (96·18 km.).
   Double thence to GÜNZBURG.
4. *Maximum permissible axle load :* 18 tonnes.
5. *Gradients :* No details are available, and spot heights shown are taken from 1/200,000 maps. The gradient rises from East to West and because of nature of ground, heavy gradients may be encountered.
6. *Curvature :* No details available, but line runs with fairly straight profile.
7. *Traction :* Steam. Line is electrified NEOFFINGEN—GÜNZBURG.
8. *Maximum distance between stations :* 6·3 km. (INGOLSTADT—DONAUWORTH.)
   7·6 km. (DONAUWORTH—NEOFFINGEN.)
9. *Marshalling Yards (MY) :* INGOLSTADT (SY), NEU ULM (Route 82).
10. *Engine Sheds (ES) :* INGOLSTADT, NEU ULM (Route 82).
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Loco. Depot at INGOLSTADT.
    (b) Junctions at INGOLSTADT, DONAUWORTH, NEOFFINGEN.
    (c) Bridges over DANUBE at 52·6 and 96·3 km.
13. *Capacity :* 18 trains per day each way, of 300/400 tons net train load each (throughout capacity).

Distance from INGOLSTADT.				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	INGOLSTADT	—	*Passenger station.* 3 platforms (1 island). *Goods station (W. of line).* Warehouse facilities—group of DES with cart access, SER. Wb (40 t.). Cr (20 t.). *Shunting yard (E. of line).* c. 12 I.S 400-600 m. ES (large), 2 roundhouses; workshop facilities; 2 Tbls. See Appendix 2 for air photograph.
⅝	1·2		Bridge over road	Line leaves DT s.o. line from München (87) and curves N.W. and then S.W. towards R. Danube.
2	3·2	HAUNWÖHR	—	Passenger halt. Tramline runs alongside to Neuburg.
4½	7·3		Bridge over road	—
5⅝	9·1	WEICHERING	—	SER. Wb (30 t.).
6½	10·5		Several bridges over streams	—
9	14·6	ROHRENFELD (378 m.)	—	SER. Wb (30 t.). Line runs through low-lying country.
12½	20·0		Bridge over road	Line curves.
12⅝	20·7	NEUBURG (DONAU) (391 m.)	—	SER. Wb (40 t.). Cr (0·5 t.). End of tramline. More hilly country.
15	24·2		—	—
16⅝	27·0	UNTERHAUSEN (BAY.) (418 m.)	—	SER.
17⅝	28·8		Bridge over road	—
18⅝	30·2		Bridge over R. Weiher	—
19	30·8	STRASS-MOOS (407 m.)	—	SER. Wb (40 t.).
20	32·4		Bridge over road.	—
20½	32·9	BURGHEIM (403 m.)	—	SER. Wb (30 t.).
21	33·9		Bridge over R. Ach	—
21¼	34·4		—	Straight section to Rain.
22⅝	36·6		Bridge over R. Muhl	
23⅞	38·4		Bridge over road	
24½	39·7		Bridge over river	—

Distance from INGOLSTADT Miles	Kms.	Station	Engineering Works	Details and Facilities
25	40·3	RAIN (405 m.)	—	SER. Wb (40 t.). Exchange facilities with tramline.
26½	42·3		Bridge over road	—
27	43·3		Bridge over R. Lech	—
27	43·5	GENDERKINGEN (408 m.)	—	Restricted goods facilities.
29½	47·7	HAMLAR (403 m.)	—	Passenger station only. End of tramline.
30	48·2		Bridge over R. Eggelsee	—
31½	50·5		—	Line curves to J (trailing) left, DT electric from Augsburg.
31⅝	51·1		Bridge over R. Schmutter	—
32	51·6		Bridge over road, and several bridges over streams	—
32½	52		Embankment	—
32½	52·6		Bridge over R. Danube	c. 200 m. long.
32⅝	52·9	DONAUWÖRTH (404 m.)	—	SER. Wb (40 t.). Cr (7·5 t.). Line curves South from Nordlingen ST line, and then straight section for 2 km.
34⅝	56·1		Bridge over road	—
36⅝	59·1		Bridge over stream	—
37½	60·5	TAPFHEIM	—	SER. Wb (30 t.).
39	62·9		Bridge over stream	—
40½	65·2	SCHWENNINGEN (RAY.)	—	Restricted goods facilities. DT at station. Straight section to Höchstädt.
41⅝	67·3	BLINDHEIM (430 m.)	—	SER. Wb (30 t.).
42⅝	68·0		Bridge over road and stream	—
44⅝	72·2	HÖCHSTÄDT (DONAU) (421 m.)	—	SER. Wb (40 t.). Cr (2·5 t.).
			Bridges over streams and road	—
46½	75·1	STEINHEIM (DONAU) (426 m.)	—	Restricted goods facilities.
47	75·9		Bridge over R. Egau	—
49	79·0		Bridge over road	—
49⅛	79·4	DILLINGEN (DONAU) (434 m.)	—	SER. Wb (40 t.). Cr (4·5 t.).
49½	79·8		—	J (facing) right, narrow gauge line to Aalen.
50½	81·5		Bridge over road	Straight section to next bridge.
51½	83·1		Bridge over road	—
52⅛	84·2	[illegible]JINGEN	—	SER. Wb (40 t.). Cr (10 t.).
54⅛	87·5		Bridge over stream	Line curves, after straight section (5 km.) from Lauingen.
54⅝	88·3		Road overbridge	—
55	88·8		Bridge over R. Brenz	—
55⅛	89·0	GUNDELFINGEN (BAY.) (434 m.)		SER. Wb (30 t.). Straight section to Neuoffingen.
55⅛	89·7		—	J (facing) right, ST line to Sonth. Brenz.
55⅛	89·8		—	J (facing) left, ST line to Peterswörth (1·5 km.).
59⅝	96·3		Bridge over Danube	c. 200 m. long.
60	96·8	NEUOFFINGEN (462 m.)	—	SER. Wb (30 t.). Joins DT s.o. line to Günzberg. (Ulm—Augsburg Route 82.)
63⅛	102		Road overbridge	Line passes under arterial road.
63½	102·2	GÜNZBURG	—	SER. Wb (40 t.). 3 DES in goods yard with road access. 1 DES serving goods shed, also with road access. For air photograph of Günzburg see Appendix 6.

ROUTE 85

TREUCHTLINGEN—DONAUWÖRTH—AUGSBURG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 75·3 km. (46¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Electric.
8. *Maximum distance between stations :* 11·4 km. (7 miles). (MÜNDLING—DONAUWÖRTH.)
9. *Marshalling Yards (MY) :* AUGSBURG.
10. *Engine Sheds (ES) :* TREUCHTLINGEN.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Electric sub-station at MERTINGEN.
    (b) Marshalling and locomotive facilities at AUGSBURG and TREUCHTLINGEN.
    (c) Junctions at TREUCHTLINGEN, DONAUWÖRTH and AUGSBURG.
    (d) Bridges on route, the most important being at 35·1 km. over DANUBE and at 69·4 km. over the autobahn.
13. *Capacity :* 72 trains per day each way, of 400 tons net train load each.

Distance from TREUCHTLINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	TREUCHTLINGEN (420 m.)	—	Wb (40 t.). Cr (2 t.). SER. ES with Tbl.
				J N. of station of DT s.o. lines from Würzburg (86) and Nürnberg (87).
				J (facing) S. of station, with DT s.o. line to München (87).
			Bridge over river	—
			Bridge over river	—
3½	5·7	MÖHREN	—	Wb (30 t.). SER.
5½	8·6	GUNDELSHEIM (456 m.)	—	Passenger halt.
			Bridge over river	—
7½	12·3	OTTING—WEILHEIM	—	Wb (40 t.). SER.
				N.E. of Fünfstetten, J (trailing), with ST s.o. DE line E. to Monheim.
11½	18·2	FÜNFSTETTEN	—	Wb (30 t.). SER.
14½	23·4	MÜNDLING	—	Wb (40 t.). SER.
			Bridge over road	—
20	32·3		Bridge over R. Wörnitz (tributary of R. Danube)	—
20½	32·8		—	J (trailing) right, with ST s.o. line from Nördlingen (Route 89).
			Bridge over road	—
21	34·0		—	J (trailing) right, with ST s.o. line from Günzburg (Route 84).
21½	34·6	DONAUWÖRTH (404 m.)	—	Wb (40 t.). Cr (7·5 t.). SER.
21¾	35·1		Bridge over R. Danube	*c.* 200 m. long.
			Bridge over R. Schmutter	—
23¾	37·6		—	J (facing) left, with ST s.o. line to Ingolstadt (Route 84).
24½	39·5	BÄUMENHEIM (404 m.)	—	Wb (40 t.). SER.
26	41·9	MERTINGEN BAHNHOF (409 m.)	—	Wb (40 t.). SER.
				N. of station, J (trailing), with ST s.o. DE line S.W. to Wertingen.
				Line runs in valley and close to the Werk canal to Augsburg.

Distance from TREUCHTLINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
30¼	49·5	NORDENDORF (482 m.)	—	Wb (40 t.). SER.
32½	52·2	WESTENDORF	—	Passenger halt.
34	54·8	MERTINGEN (432 m.)	—	Wb (40 t.). Cr (1·2 t.). SER. Electric sub-station.
35	56·6	HERBERTSHOFEN (434 m.)	—	Passenger halt.
			Bridge over road	—
38	61·0	LANGWEID (LECH) (452 m.)	—	Wb (30 t.). SER.
39¾	64·0	GABLINGEN (461 m.)	—	Wb (30 t.). SER. S. of station, J (facing), with DE line to factory by canal.
42½	68·5	GERSTHOFEN (472 m.)	—	Wb (40 t.). SER.
43	69·4		Bridge over autobahn München—Stuttgart	*c.* 200 m. long.
44½	71·8		Railway overbridge	Carrying DT electrified line from Ulm (Route 82).
45½	72·8		—	J (trailing) with above line.
45¾	73·1	AUGSBURG—OBERHAUSEN (474 m.)	—	Wb (40 t.). Cr (12 t.). SER.
46	74·1		—	J (facing) with ST DE line to Göggingen.
46	74·2		Bridge over R. Lech	—
46¾	75·3	AUGSBURG (Main station) (489 m.)	—	Wb (40 t.). Cr (15 t.). SER. Junction station. Augsburg is also the junction for— (1) DT s.o. line from Buchloe. (2) Electrified line from München (Route 82). MY—capacity 2,300 wagons per 24 hours hump. *Loco. Depot* 2 ES (large) roundhouse. Workshops attached. RpS—adjoining Loco. depot. For air photograph of Augsburg, see Appendix 12.

ROUTE 86

FRANKFURT—HANAU—ASCHAFFENBURG—GEMÜNDEN—WÜRZBURG—ANSBACH—TREUCHTLINGEN

General Details

1. *Gauge :* 1435 mm. (Standard).
2. *Length :* 273·2 km. (169¾ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* Line rises steadily from FRANKFURT to MARKBREIT (alt. 204 m.) (159·2 km.) where it leaves the valley of the R. MAIN and enters very mountainous country to OBERDACHSTETTEN (alt. 440 m.) (201·9 km.) the highest point on the line. The gradient then falls to a point between ANSBACH (221·3 km.) and GUNZENHAUSEN (249·5 km.) from whence the gradient rises again to TREUCHTLINGEN (alt. 420 m.).
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9·2 km. (5¾ miles) (ANSBACH—WINTERSCHNEIDBACH).
   9·1 km. (5⅝ miles) (BURGBERNHEIM—OBERDACHSTETTEN).
9. *Marshalling Yards (MY) :* FRANKFURT OST.
   ASCHAFFENBURG.
   WÜRZBURG.
10. *Engine sheds (ES) :* FRANKFURT.
    FRANKFURT OST.
    HANAU.
    ASCHAFFENBURG WEST.
    ASCHAFFENBURG (HBF).
    GEMÜNDEN.
    WÜRZBURG.
    ANSBACH.
    TREUCHTLINGEN.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and Locomotive facilities referred to in paras 9 and 10.
    (b) Junctions at FRANKFURT, HANAU, ASCHAFFENBURG, GEMÜNDEN, WÜRZBURG, STEINACH, ANSBACH, GUNZENHAUSEN and TREUCHTLINGEN.
    (c) *Bridges on route*—the largest being those over the MAIN at 1.6 and 136·5 km., and over the ALTMÜHL at 250·2 km.
13. *Capacity :* 60 trains per day each way, of 400 tons net train load each.

Distance from FRANKFURT SÜD

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	FRANKFURT SÜD	—	Restricted goods facilities. Wb (30 t.). Cr (20 t.). SER. *Loco. Depot. Rp S. and MY*—North of Frankfurt Main Station. For air photograph of Frankfurt (Main), see Appendix 17. Line runs in the valley of R. Main to Aschaffenburg.
½	1·0		—	J (facing) left with line to Hanau, via Offenbach.
¾	1·3		Bridge over railway line from Offenbach local station	—
¾	1·4		Bridge over DE line	—
1	1·6		Deutschherrn bridge over R. Main, also over road and over DE siding from docks.	600 m. long—3 main steel arch spans also 16 approach spans.
			Bridge over line from Griesheim to docks.	
			—	Line runs on embankment.
			Bridge over road	—
1½	2·4	FRANKFURT—OST	—	Wb (60 t.). Cr (30 t.). SER.
			2 road overbridges	MY—capacity 2,700 per 24 hours. *Loco. Depot.* ES—roundhouse. For air photograph of Frankfurt (Ost), see Appendix 18.

Distance from FRANKFURT SÜD.

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
4½	7·2	FRANKFURT—MAINKUR	—	Wb (33 t.). SER.
6	10·1	BISCHOFSHEIM—RUMPENHEIM	—	Passenger station only.
7½	12·3	HOCHSTADT—DÖRNIGHEIM	—	—
9⅝	15·7	HANAU—WILHELMSBAD	—	Restricted goods facilities.
11	18·0	HANAU WEST	—	Passenger station only. ES at Hanau.
11⅝	19·1		Flyover	Line crosses DT s.o. line from Offenbach. Hanau main station is on this line.
12⅝	20·6		—	J (facing), left with DT s.o. line to Friedburg, also with DT. s.o. line to Fulda.
13⅛	21·3		—	J (facing) right, with ST s.o. line to Babenhausen.
13½	21·8	GROSSAUHEIM	—	—
14⅝	23·9		—	J (trailing) left, with loop connection to line to Fulda.
15⅝	25·3	GROSSKROTZENBURG		Passenger station only.
17	27·4	KAHL (MAIN)	—	Junction station. Wb (35 t.). SER. J (left), with D.E ST s.b. line to Schöllkrippen (23 km.).
17½	28·1		Bridge over R. Kahl	—
19⅝	31·8	DETTINGEN (MAIN)	—	SER.
22⅝	36·9	KLEIN OSTHEIM	—	—
25	40·5		—	J (trailing) right, with DT s.o. line from Darmstadt.
			Bridge over R. Aschaff	—
26⅝	43·2	ASCHAFFENBURG (Main station)	— —	Wb (40 t.). Cr (10 t.). SER. ES (Aschaffenburg W.). MY capacity 3,000 wagons per day.
27	43·7		—	J (facing) right, with ST s.o. line to Worth.
28⅛	45·6		—	J (trailing) right, with loop connection to above line. Line leaves valley of R. Main, turns E. N. E. and runs in valley of R. Aschaff to Laufach.
28⅝	46·4	ASCHAFFENBURG—GOLDBACH	—	Wb (40 t.).
31	49·9	HOSBACH	— Bridge over road.	Wb (31 t.). SER.
32⅛	53·7	LAUFACH	— 3 bridges over roads	Wb (40 t.). SER. —
37	59·8		Tunnel	c. 1,700 m. long. Sharp curve in tunnel.
38⅛	61·6	HEIGENBRÜCKEN	—	Wb (40 t.). SER. Line runs in valley of R. Lohr to Lohr, where the R. Lohr flows into the R. Main.

Distance from FRANKFURT SÜD.

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
41½	67·1	WIESTHAL	—	Wb (31 t.).
			Bridge over R. Lohr between Wiesthal and Partenstein	
			2 bridges over roads	
46½	74·6	PARTENSTEIN	—	Wb (40 t.). SER.
49½	80·3		—	J (trailing) right, with ST s.o. line from Wertheim.
50½	81·1	LOHR BAHNHOF	—	Line turns N.E. following the valley of the R. Main. Station is north of town.
				Wb (40 t.). Cr (5 t.). SER.
53½	86·0		Bridge over road	—
55½	87·4	NEUENDORF (MAIN)	—	Restricted goods facilities.
				Sharp curve in line.
56½	91·3	LANGENPROZELTEN	—	Wb (32 t.). SER.
57½	93·1		—	J (trailing) left, with s.o. line from Elm (ST except for section from Mottgers to Jossa, which is DT.
				There is a junction between above line and ST s.o. line from Ebenhausen, north of Gemünden station.
58	93·5		Bridge over R. Sinn	—
58½	94·7	GEMÜNDEN (MAIN)	—	Wb (40 t.). SER. ES. Tbl. W.
				Line continues to follow valley of R. Main, South-East.
60½	97·8	WERNFELD	—	Wb (32 t.). SER.
				J (facing) left, with ST s.o. line to Waigolhausen.
			Bridge over road immediately south of station	—
64	103	GAMBACH (MAIN) (162 m.)	—	Restricted goods facilities.
65½	105·7		Bridge over road	—
67	108·1	KARLSTADT (Main) (165 m.)	—	Wb (40 t.). SER.
70½	113·9	HIMMELSTADT (167 m.)	—	Passenger station only.
72	116·0	RETZBACH (168 m.)	—	Wb (32 t.). SER.
74½	119·7	THÜNGERSHEIM	—	Wb (32 t.). SER.
76½	122·8	ERLABRUNN	—	Passenger station only.
78½	126·3	VEITSHÖCHHEIM	—	Wb (30 t.). SER.
79	127·2		Bridge over road	—
80	128·7	WÜRZBURG—ZELL (174 m.)	—	Wb (40 t.). SER.
80½	130·1		—	J (trailing) right, with short dead end spur down to R. Main (*c.* 1 km.).
81½	131·2		—	J (facing) right, with short dead end spur to customs house by river (*c.* 1 km.).

Distance from FRANKFURT SÜD

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
82½	132·5	WÜRZBURG (Main station)	—	Wb (40 t.). Cr (15 t.). SER. MY—capacity 2,000 wagons per day. ES.
				Line curves sharply *c.* 1 km. after station and turns South.
83	133·7		—	J (facing) left, with short dead end spur (*c.* 1·5 km), also J (facing) left, with DT s.o. line to Scheinfurtstadt.
84	135·1	WÜRZBURG SÜD	—	Passenger station only.
84¼	136·2		Road overbridge	Skew.
84½	136·5		Bridge over R. Main	—
85¼	137·9		—	J (facing) right, with DT s.o. line to Lauda.
			Bridge over stream	—
86¼	138·8	HEIDINGSFELD OST	—	Wb (32 t.). SER.
87	140·3	RANDERSACKER	—	Passenger halt.
89¼	144·1	ROTTENBAUER	—	Passenger halt.
91	146·5	WINTERHAUSEN	—	Wb (40 t.). SER.
92¾	149·4	GOSSMANNSDORF	—	Restricted goods facilities.
94¼	151·8		—	J (right), with ST s.o. line to Weikersheim.
95¼	153·7	OCHSENFURT (194 m.)	—	Wb (40 t.). Cr (5 t.). SER.
99	159·2	MARKTBREI (204 m.)	—	Wb (40 t.). SER.
				Line leaves valley of R. Main, turns S.S.E. and starts to climb into very mountainous country until reaching Oberdachstetten (440 m.) the highest point on the line.
103¼	166·6	GNÖTZHEIM	—	Wb (31 t.). SER.
105¾	170·1	HERRNBERCHTHEIM (369 m.)	—	Wb (32 t.) SER.
109¼	176·5	UFFENHEIM (342 m.)	—	Wb (40 t.). SER.
111¼	179·7		Bridge over road	—
113¼	182·6	ERMETZHOFEN	—	Wb (30 t.). SR.
117¾	189·6	STEINACH (369 m.)	—	Wb (40 t.). SER.
				J (facing) right, with ST s.o. line to Dombühl, North of station.
				J (facing) left, with ST s.o. line to Neustadt, South of Station.
120	192·8	BURGBERNHEIM BAHNHOF (391 m.)	—	SER.
			Bridge over road	—
124¼	200·5		Bridge over R. Rezat	—
			—	Line runs in valley of R. Rezat.
125¼	201·9	OBERDACHSTETTEN (440 m.)	—	Wb (32 t.). Cr (5 t.). SER.
127¼	205·2		Bridge over tributary of R. Rezat	—
129¼	208·5	ROSENBACH (BAY.) (422 m.)	—	Wb (40 t.). SER.
			Several bridges over tributaries of R. Rezat	
132	212·6		Bridge over R. Rezat	—
			2 bridges over roads	

Distance from FRANKFURT SÜD

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
132½	213·1	LEHRBERG (411 m.)	—	Wb (31 t.). SER (less than 7m. long).
133	213·9		Bridge over tributary of R. Rezat	—
137	220·3		—	J (trailing) right, with DT s.o. line from Crailsheim (74).
			2 bridges over roads	—
137½	221·3	ANSBACH (402 m.)	—	Wb (40 t.) Cr (15 t.). SER ES.
				Line leaves valley of R. Rezat.
138½	223·0		—	J (facing) left, with DT s.o. line to Nürnberg
140½	225·9		Bridge over stream	2 short dead end spurs.
143½	230·5	WINTERSCHNEIDBACH	—	Wb (31 t.). SER.
			Bridge over road	—
147½	237·1	TRIESDORF	—	Wb (32 t.). SER.
151	242·9	ALTENMUHR	—	Wb (31 t.). SER.
151½	243·4		Bridge over road	—
154½	248·7		—	J (trailing) left, with ST s.o. line from Pleinfeld.
155	249·5	GUNZENHAUSEN (416 m.)	—	Wb (40 t.). Cr (10 t.). SER.
			Bridge over road	—
155½	250·2		Bridge over R. Altmuhl	Line runs in valley of R. Altmuhl to Treuchtlingen.
156½	251·6		—	J (facing) right, with ST s.o. line to Nördlingen.
			Bridge over road	—
160½	258·0	WINDSFELD—DITTENHEIM	—	SER.
162½	261·9	EHLHEIM	—	Passenger station only.
			Bridge over stream	—
164½	265·2	MARKT BEROLZHEIM	—	SER.
167½	269·2	WETTELSHEIM	—	Wb (32 t.).
				J (trailing) left, with DT electrified line from Nürnberg (Route 87).
169½	273·2	TREUCHTLINGEN	—	Wb (40 t.). Cr (2 t.). SER. ES.
				Junction for DT electrified line from Augsburg (Route 85) and DT s.o. line from München (Route 87).

ROUTE 87

NÜRNBERG—TREUCHTLINGEN—INGOLSTADT—MÜNCHEN

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 198·6 km. (123¼ miles).
3. *Track :* Double. 0—194 km. (120½ miles).
   Multiple. 194—198·6 km. (120½—123¼ miles).
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 7·2 km. (4½ miles).
9. *Marshalling Yards (MY) :* NÜRNBERG, MÜNCHEN-LAIM, MÜNCHEN-OST.
10. *Engine Sheds (ES) :* NÜRNBERG, TREUCHTLINGEN, INGOLSTADT, MÜNCHEN (Main Station). Possibly removed to MÜNCHEN-PASING.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling Yards and locomotive facilities referred to in paras. 9 and 10.
    (b) Junctions at NÜRNBERG, PLEINFELL, TREUCHTLINGEN, INGOLSTADT and MÜNCHEN.
    (c) Bridges on route. The line is particularly vulnerable in this respect between 66·5 and 80·0 km. where it frequently crosses the ALTMÜHL.
13. *Capacity :* 60 trains per day each way, of 400 tons net train load each.

Distance from
NÜRNBERG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	NÜRNBERG (Main Station)	—	Wb (48 t.). Cr (20 t.). SER. Head Customs office (for details of station facilities, see Route 74).
½	0·9		—	J (facing) left, with DT s.o. line to (1) Würzburg (Route 90). (2) Bamberg.
¾	1·2		Bridge over Ludwigs canal	—
				J (facing) right, with DT s.o. line to Bretten (Route 74).
1	1·5		Flyover	Line passes over DT s.o. line Nürnberg—Bretten (Route 74).
				J (trailing) left, with DT s.o. line to Bretten.
				J (trailing) right, with ST DE line to works N. of Bretten line.
				Line continues S.
1¾	3·0	NÜRNBERG (SANDREUTH)	—	Passenger halt.
2¼	3·8		Bridge over railway	Line passes over avoiding line from Fürth (Route 90) to MY and Regensburg.
3¼	5·2	NÜRNBERG (EIBACH)	—	Passenger halt.
3½	5·7		Bridge over stream	—
5¼	8·4	NÜRNBERG (REICHELSDORF)	—	Wb (40 t.). SER.
5½	9·1		Bridge over road	—
6¼	10·1	REICHELSDORFER KELLER	—	Passenger halt.
6½	10·6		Bridge over Reinitz	—
7	11·5	KATZWANG	—	Passenger halt.
			Bridge over road	—
8¼	13·3	LIMBACH	—	Passenger halt.
9	14·5		Bridge over road	—
9¼	15·0	SCHWABACH	—	Wb (48 t.). Cr (0·75 t.). SER.

Distance from NÜRNBERG *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
11¾	18·9	REDNITZHEMBACH	—	Restricted goods traffic.
11¾	18·9		Bridge over R. Rednitz	—
				Line follows valley of R. Rednitz.
14	22·5	BÜCHENBACH	—	Restricted goods traffic.
15½	25·0		Bridge over road	—
				J (facing) left, with ST s.o. DE line to Greding.
18½	29·4	UNTERHECKENHOFEN	—	Restricted goods facilities.
20½	33·4		Bridge over R. Frankisch Rezat	—
21	34·0	GEORGENSGMÜND	—	Wb (32 t.). SER.
				J (facing) right, with ST s.o. DE line to Spalt—6·9 km.
23	34·1		Bridge over road	—
23¼	37·8	MÜHLSTETTEN	—	Passenger station only.
			Bridge over road	—
27	43·7	PLEINFELD (374 m.)	—	Wb (40 t.). Cr (0·7 t.). SER.
				Line runs parallel to arterial road, Nürnberg—Augsburg.
				J (facing) right, with ST branch line to Gunzenhausen (Route 89).
28¼	46·0		Bridge over tributary of R. Rednitz	—
29¼	47·0		Bridge over tributary of R. Rednitz	—
30	48·0	ELLINGEN (BAY.) (398 m.)	—	Wb (30 t.). SER.
30¼	49·3		Bridge over arterial road (Ansbach—Ellingen)	—
32	51·7		Bridge over R. Rednitz	—
33	53·0	WEISSENBURG (BAY.) (448 m.)	—	Wb (40 t.). Cr (6 t.). SER.
34¼	55·3		—	—
36	[illegible]	GRÖNHART (420 m.)	—	Restricted goods facilities.
37	59·5		Bridge over road	—
37¼	60·0		Bri over road	—
37¼	60·6		Bridge over light railway and R. Altmühl	—
38	61·3		—	J (trailing) left, with DT s.o. line from Ansbach.
38¼	61·8	TREUCHTLINGEN (429 m.)	—	Wb (40 t.). Cr (2 t.). SER. ES.
				Terminus of electric DT line from Augsburg (Route 85).
39	63·0		—	J (facing) right, with DT line referred to above.
40¾	65·1		Bridge over arterial road Nürnberg—Augsburg	Line runs S.E. along valley of Altmühl to Dollnstein.
41¼	66·5		Bridge over R. Altmühl	—
42¼	68·2	PAPPENHEIM (410 m.)	—	Wb (40 t.). Cr (7·5 t.). SER.
			Bridge over R. Altmühl	—
42¼	68·7		Bridge over R. Altmühl	
43¼	69·6		Bridge over R. Altmühl	
43¼	70·2		Bridge over R. Altmühl	—

Distance from NÜRNBERG *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
45½	73·4	SOLNHOFEN (400 m.)	—	Wb (40 t.). Cr (1·2 t.). SER.
47½	76·0		Bridge over R. Altmühl	—
48	70·0		Bridge over R. Altmühl	—
48½	78·2		Bridge over R. Altmühl	—
49½	80·0		Bridge over R. Altmühl	—
50	80·5		—	J (trailing) right, with ST s.o. DE line from Rennertshofen.
50	80·6	DOLLNSTEIN (402 m.)	—	WB (30 t.). SER. Line continues in a S. Easterly direction along bank of R. Altmühl.
54½	87·5	OBERREICHSTATT	—	Restricted goods facilities.
56	90·2	(409 m.)	Bridge over road	—
56½	90·6		Bridge over road	—
				Line leaves valley of Altmühl and continues S.E. on rising gradient.
				J (trailing) left, with ST s.o. line from Bühlkirchen and Neumarkt.
				(J for Regensburg line).
56½	90·9	EICHSTÄTT BAHNHOF	—	Wb (40 t.). SER. Terminus of ST s.o. branch line to Neumarkt.
58½	94·1		Bridge over road	—
59½	95·7	ADELSCHLAG (442 m.)	—	Wb (30 t.). SER.
60	96·7		Bridge over main road	—
				Falling gradient to Ingolstadt.
62½	101·1	TAUBERFELD (420 m.)	—	Wb (30 t.). SER.
63	101·5		Road overbridge	—
64½	103·9		Bridge over road	—
64½	104·4	EITENSHEIM (403 m.)	—	Wb (30 t.).
			Bridge over road	—
67½	108·6	GAIMERSHEIM (387 m.)	—	Wb (40 t.). SER.
67½	109·1		Bridge over road	—
68	109·6		Bridge over road	—
70½	114·0		—	J (trailing) left, with ST s.o. DE line from Riedenburg—38·7 km.
71	114·3	INGOLSTADT—NORD	—	Wb (40 t.). SER. J (facing) left, with ST loop line to DE line to Riedenburg.
		INGOLSTADT—SCHLACHTHOF	—	Passenger halt.
				J (facing) right, with ST s.o. line to Donauwörth (Route 89).
73	117·6	INGOLSTADT (Main Station) (368 m.)	—	Wb (40 t.). Cr (20 t.). SER. ES (medium) roundhouse. RpS (locos., passenger, goods)—total staff 1,462 (includes personnel operating at Augsburg). For air photograph of Ingolstadt, see Appendix 2.
73½	118·8		—	J (facing) right, with ST s.o. line to Regensburg; left with ST s.o. line to Augsburg.

Distance from NÜRNBERG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
75½	121·5	OBERSTIMM	—	Passenger station only.
76½	122·9		Bridge over arterial road Würzburg—München	—
77½	124·4		—	J (trailing) left, with short DE works line (*c.* 2 km.).
78½	126·2	REICHERTSHOFEN (375 m.)	—	Wb (40 t.). SER.
			Bridge over arterial road Würzburg—München	—
				—
				Line bears S.E.
81½	131·3		Road overbridge	Line passes under road from Regensburg to Augsburg.
81½	131·8		—	—
82½	132·4	Hög	—	Passenger station only.
84	135·2	(420 m.)	—	—
85½	137·8		Bridge over R. Ilm	—
				Line follows course of Ilm to Paindorf.
85½	138·1		—	J (trailing), with ST s.o. lines— (1) From Giesenfeld. (2) From Langenbach (J with DT electric line München—Regensburg).
86	138·4	WOLNZACH BAHNHOF (400 m.)	—	Wb (40 t.). SER.
87	140·2		Bridge over arterial road Regensburg—München	—
				Line runs parallel with arterial road for *c.* 14 km.
88½	142·2		Bridge over arterial road Regensburg—München	—
89	143·2	WALKERSBACH (413 m.)	—	Passenger station only.
91½	146·8		Bridge over arterial road Regensburg—München	—
				—
92½	148·9	PFAFFENHOFEN (ILM) (432 m.)	—	Wb (30 t.). Cr (8 t.). SER. Customs office.
93½	151·7		Bridge over stream	—
96	154·8	REICHERTSHAUSEN (ILM)	—	Wb (30 t.). SER.
96½	155·5		Bridge over arterial road	—
98½	158·4	PAINDORF	—	Restricted goods facilities.
				Line leaves course of R. Ilm.
100½	162·2	PETERHAUSEN (OBERBAX) (469 m.)	—	Wb (40 t.). SER.
101½	163·8		Bridge over R. Glonn	—
104½	168·2	ESTERHOFEN	—	Restricted goods facilities.
106½	171·4	RÖHRMOOS	—	Wb (40 t.). SER.
109½	176·0	WALPERTSHOFEN	—	Wb (30 t.).
111½	179·8		—	J (trailing) right, with ST s.o. line from Altomünster (20·9 km.)
111½	180·0		Bridge over R. Amper	—
112½	180·6		Bridge over Moos canal	—
112½	180·8	DACHAU BAHNHOF (482 m.)	—	Wb (30 t.). SER.
115½	185·7		Bridge over Worms canal	—

Distance from NÜRNBERG *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
115½	185·9	MÜNCHEN-KARLSFELD	—	Passenger halt.
117	188·2	MÜNCHEN—ALLACH	—	Wb (30 t.). SER.
118½	191·1	MÜNCHEN—OBERMENZING	—	—
			Bridge over road	—
119½	192·0		—	J (trailing) left—line runs 4-track with DT electrified line from Regensburg.
				J (facing) left, with Laim MY.
120½	193·4		Flyover	Line passes under 6-track line from— (1) Augsburg (Route 82), electric. (2) Buchloe (DT s.o.). (3) Herrsching (ST electric). (4) Tutzing (DT electric). Line runs parallel with above line as 8-track to München.
121½	195·4		—	J (facing) right, with DT electrified line to Salzburg and Innsbruck.
		MÜNCHEN (LAIM)	—	MY left of line—capacity 2,900 wagons per 24 hours. Wb (60 t.). SER. Cr (24·5 t.).
123½	198·6	MÜNCHEN	—	Main passenger station. Terminus for DT electrified lines to— (1) Stuttgart. (2) Regensburg. (3) Salzburg (for Austria). (4) Innsbruck (for Italy). (5) St. Johann (for Austria). DT s.o. lines to— (1) Nürnberg. (2) Lindau (Switzerland).
		MÜNCHEN (West)	—	MY for traffic to and from Austria and Italy. Capacity 200 wagons per 24 hours.

ROUTE 88

AUGSBURG—INGOLSTADT

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 66·7 km. (41½ miles).
3. *Track :* 4·9 km—double (AUGSBURG—HOCHZOLL).
   61·8 km.—single (AUGSBURG (HOCHZOLL)—INGOLSTADT.
4. *Maximum permissible axle load :* 18 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* AUGSBURG—HOCHZOLL—electrified.
   HOCHZOLL—INGOLSTADT—steam.
8. *Maximum distance between stations :* 6·6 km. (4 miles).
9. *Marshalling yards (MY) :* AUGSBURG.
10. *Engine Sheds (ES) :* AUGSBURG, INGOLSTADT.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Marshalling and Locomotive facilities at AUGSBURG and INGOLSTADT.
    (b) Junctions at AUGSBURG and INGOLSTADT.
13. *Capacity :* 20 trains per day each way, of 300/400 tons net train load each (throughout capacity).

Distance from AUGSBURG				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	AUGSBURG (Main station) (489 m.)	—	Wb (40 t.). Cr (5 t.). SER. RpS.
				ES.
				MY—capacity 2,300 wagons per 24 hours.
				J (facing) right, with DT s.o. line from Buchloe.
1	1·7	HAUNSTETTERSTRASSE	—	Passenger halt.
2½	3·8	SPICKEL	—	Passenger halt.
			Bridge over R. Lech	—
3	5·9	AUGSBURG—HOCHZOLL (496 m.)		MY—capacity 2,300 wagons per 24 hours.
				Wb (30 t.). SER.
				J (facing) with DT line to München.
				DT section ends and line continues ST to Ingolstadt.
4½	·8	FRIEDBERG (BEI AUGSBURG)	—	Wb (40 t.). SER.
7½	12·4	PAAR	—	Restricted goods facilities.
9½	15·4	DASING (468 m.)	—	Wb (30 t.). SER.
			—	Line runs in valley of R. Paar.
10½	16·6		Road overbridge	Crossing autobahn—München—Stuttgart.
12½	19·9	OBERGRIESBACH (458 m.)	—	Wb (30 t.). SER.
14	22·4		Bridge over stream	—
15½	25·4	AICHACH (446 m.)	—	Wb (40 t.). SER.
20	32·0	RADERSDORF (431 m.)	—	Wb (40 t.). SER.
20½	33·5		Bridge over R. Paar	—
21½	34·3		Bridge over R. Paar	—
22½	36·1	HÖRZHAUSEN (422 m.)	—	Passenger station only.
25	40·3		Bridge over road	—
			Bridge over road	—
25½	41·0	SCHRODENHAUSEN (414 m.)	—	Wb (40 t.). Cr (0·6 t.). SER.

Distance from Augsburg				
Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
29	46·6	Edelshausen (406 m.)	—	Wb (40 t.). SR.
30½	49·3		Bridge over Muhl brook	—
33	53·0	Niederarnbach (382 m.)	—	Wb (40 t.). SER.
34	54·9		Bridge over Haupt-Canal	—
35	56·5	Pobenhausen (390 m.)	—	Passenger station only.
36¼	58·3		Bridge over road	—
36¾	59·3		Bridge over canal	—
38	61·0	Zuchering	—	Wb (30 t.). SER.
			Bridge over stream	—
			Bridge over road.	
40¼	64·8		—	Immediately before J below. J (trailing), with DT s.o. line from München (Route 87), also J (trailing), with ST s.o. line from Regensburg—Prüfening.
41½	66·7	Ingolstadt (Main Station)	—	Wb (40 t.). Cr (20 t.). SER. ES.
				Rp S locos., passenger, goods—total staff 1,462 (includes personnel operating at Augsburg).
				N. of the station.
				J (trailing), with ST s.o. line from Donauwörth (Route 84).

ROUTE 89

DONAUWÖRTH—NÖRDLINGEN—GÜNZENHAUSEN—PLEINFELD

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 86·6 km. (53⅞ miles).
3. *Track :* Single.
4. *Maximum permissible axle load :* 18 metric tonnes (DONAUWÖRTH—NÖRDLINGEN—GÜNZENHAUSEN).
   20 metric tonnes (GÜNZENHAUSEN—PLEINFELD).
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Probably steam.
8. *Maximum distance between stations :* 5·4 km. (3⅜ miles) (DONAUWÖRTH—NÖRDLINGEN).
   7·9 km. (5 miles) (NÖRDLINGEN—GUNZENHAUSEN).
   8·6 km. (5⅜ miles) (GUNZENHAUSEN—PLEINFELD)
9. *Marshalling Yards (MY) :* None.
10. *Engine sheds (ES) :* NÖRDLINGEN.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (a) Locomotive facilities at Nördlingen.
    (b) Junctions at DONAUWÖRTH, NÖRDLINGEN, GÜNZENHAUSEN and PLEINFELD.
    (c) Bridges—several river bridges on route (for particulars, see description of line).
13. *Capacity :* 16 trains per day each way, of 300/400 tons net train load each (throughout capacity).

Distance from DONAUWÖRTH

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	DONAUWÖRTH	—	SER. Wb (40 t.). Cr (7·5 t.). J for lines— South, DT electric to Augsburg (Route 85). East, ST s.o. to Ingolstadt (Route 84). S.W. to Neoffingen (Route 84). North to Treuchtlingen, DT electric (Route 85).
⅞	1·3		—	J (facing) right, with DT electric line to Treuchtlingen. Line runs N.W. along valley of Wörnitz, as ST.
2⅜	4·6		Bridge over road	—
3⅜	5·4	WÖRNITZSTEIN	—	Passengers only.
6⅜	10·0	HARBURG	—	SER. Wb (40 t.).
7⅛	·6		Bridge over R. Wörnitz	*c.* 100 m.
7⅞	12·3		Bridge over R. Wörnitz	*c.* 100 m.
8	12·8		Bridge over R. Wörnitz	*c.* 100 m.
9⅜	15·3		Bridge over R. Wörnitz	—
10	16·1	HOPPINGEN	—	Passengers only. Line leaves valley of R. Wörnitz.
12⅝	20·4	MÖTTINGEN	—	SER. Wb (40 t.).
13	21·4		Bridge over stream (tributary of Eger)	—
15	24·3	GROSSELFINGEN	—	Passengers only.
18	29·3	NÖRDLINGEN	—	SER. Wb (40 t.).
18⅛	29·7		—	J (facing) left, with ST s.o. line to Goldshöfe (Route 79).
18⅝	30·0		—	J (facing) left, with ST s.o. line to Dombühl (Route 91).
19⅝	31·0		—	J (facing) right, with DE ST s.o. line to Wemding (17·3 km.).
20	32·3		Bridge over stream	—
21⅛	34·1		Bridge over stream	—
21⅝	35·2		Bridge over stream	—

Distance from DONAUWÖRTH *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
22½	36·8	DÜRRENZIMMERN	—	—
25	41·2		Bridge over road	—
26½	42·3	BETTINGEN (BAY.)	—	SER. Wb (30 t.).
26½	42·6		Bridge over road	—
27	43·6		Bridge over R. Wörnitz	c. 100 m. Line rejoins Wörnitz valley.
31	50·0	AUHAUSEN	—	SER (not more than 7 m. long). Wb (40 t.).
33½	54·2	WASSERTRÜDINGEN	—	SER. Wb (30 t.). Line leaves Wörnitz valley.
34½	55·2		Bridge over stream	—
35½	57·2		Bridge over stream	—
35½	57·8	UNTERSCHWANINGEN	—	Passengers only.
38	60·9	CRONHEIM	—	SER. Wb (30 t.).
41½	66·8		—	J (trailing) right, with DT s.o. line from Treuchtlingen (Route 86). End of ST line.
42½	68·0		Bridge over Altmuhl	c. 100 m.
42½	68·8	GÜNZENHAUSEN	—	SER. Wb (40 t.). Cr (10 t.). J for DT s.o. lines— South to Treuchtlingen (Route 86). North to Ansbach (Route 86).
43	69·5		—	J (facing) left, with DT s.o. line to Ansbach (Route 86). End of DT. Beginning of ST line runs east with rising gradient.
46½	75·2		Bridge over road	—
48	77·4	LANGLAU	Bridge over road	Wb (30 t.).
52½	84·3	RAMSBERG	—	Passengers only.
53½	85·8		—	J (trailing) right, with DT electric line from Treuchtlingen (Route 87). End of ST. Beginning of DT.
53½	86·6	PLEINFELD	—	SER. Wb (40 t.). Cr (·7 t.).

ROUTE 90

WÜRZBURG—NEUSTADT BHF—NÜRNBERG

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 102·2 kms. (63½ miles).
3. *Track :* Double.
4. *Maximum permissible axle load :* 20 metric tons.
5. *Gradients :* No details available.
6. *Curvature :* No details available.
7. *Traction :* Steam.
8. *Maximum distance between stations :* 9·5 km. (NEUSTADT—ELMSKIRCHEN.)
9. *Marshalling Yards (MY) :* WÜRZBERG, NÜRNBERG.
10. *Engine Sheds (ES) :* WÜRZBURG, NÜRNBERG.
11. *Watering facilities (W) :* WÜRZBURG, NÜRNBERG.
12. *Vulnerable points :*
    (a) Marshalling and locomotive facilities at WÜRZBURG and NÜRNBERG.
    (b) Junctions at 9.2 km. (ROTTENDORF), 93.0 km. (FÜRTH) and in NÜRNBERG area.
    (c) Bridges on route ; the largest is that over the R. MAIN between 22.9 and 28·3 km.
13. *Capacity :* 60 trains per day each way, of 400/500 tons net train load each.

Distance from WÜRZBURG

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	WÜRZBURG (Main Station)	—	Wb (40 t.). Cr (15 t.). SER.
				ES (large) rectangular. W. Tbl.
				MY, capacity 2,000 wagons per 24 hours.
				J (facing) left, with 2 DE spurs.
¾	1·3		—	J (facing) right, with DT s.o. line to Treuchtlingen (86).
1¼	2·3	ARTILLERIEKASERNE	—	Passenger halt.
			Bridge over road	—
			Bridge over stream	—
				Sharp curve left, line runs N. through Rottendorf station, then turns N.E. for *c.* 2·5 km., then curves right and runs S.E.
			Bridge over road	—
4¼	7·0	ROTTENDORF	—	Wb (40 t.). SER.
5¾	9·2		—	J (facing) left, with DT s.o. line to Schweinfurt.
8¾	14·0	DETTELBACH BAHNHOF	—	Wb (32 t.). SER.
				DE branch line to the left from main station to Dettelbach—Stadt (5 km.).
			Bridge over stream	
11¼	18·0	BUCHBRUNN—MAINSTOCKHEIM	—	Restricted goods facilities.
				Line now runs in the valley of the R. Main.
				J (trailing) left, with ST s.o. line from Schweinfurt.
			Bridge over road	
14¼	22·0	KITZINGEN		Wb (40 t.). Cr (6·25 t.). SER.
			Bridge over road	
			Bridge over road and R. Main	*c.* 400 m. long.
				Line leaves valley of R. Main and runs S.E.

Distance from WÜRZBURG *Miles*	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
17½	28·3	MAINBERNHEIM	—	Wb (32 t.). SER.
			Bridge over road	—
18½	29·5			Line curves to left and then right, then runs E. S. E.
			Bridge over road	—
20½	32·4	IPHOFEN	—	Wb (31 t.). SER.
			Bridge over road	—
20½	34·0	MARKT EINERSHEIM	—	Wb (32 t.). SR.
			Bridge over river	—
23⅝	38·2	HELMITZHEIM	—	—
			Several bridges over streams	—
29	46·5	MARKT BIBART	—	Wb (32 t.). SER.
			Bridge over stream	—
			Bridge over road	—
33⅛	53·5	LAGENFELD (MITTELFR.)	—	SER.
			Bridge over road	—
			Several bridges over streams	—
37⅛	60·0		Bridge over road	—
			Bridge over R. Aisch	—
37½	60·6		—	J (trailing) right, with ST s.o. line from Steinach.
38	61·2	NEUSTADT (AISCH) BAHNHOF	—	Wb (40 t.). Cr (1·5 t.). SER.
				Neustadt Stadt station is on the line to Forcheim.
38½	61·5		—	J (facing) left, with ST line to Forcheim.
42½	68·3		Road overbridge	—
44	70·7	ELMKIRCHEN	—	Wb (30 t.). SER.
			2 bridges over roads	—
			Bridge over stream	—
47	75·8	HAGENBÜCHACH		SER.
			Bridge over road	—
				Line curves sharply between Hagenbüchach and Puschendorf.
50½	81·2	PUSCHENDORF	—	Passenger station only.
52	83·9		Bridge over R. Renn	—
52½	84·4		—	J (trailing) right, with DE ST s.o. line to Markt Erlbach (17·7 km.).
52⅝	85·0	SIEGELSDORF	—	Wb (40 t.). SER.
			Bridge over road	—
55½	88·9	BURGFARRNBACH	—	SER.
			Bridge over road	—
			Bridge over stream	—
57	92·0	OSTERFÜRBERG	—	Passenger halt.
57½	93·0		—	(1) J (trailing) right, with DE ST s.o. line to Cadolzburg 12·5 km.). (2) J (trailing) left, with DT s.o. line from Bamberg.
58	93·4		Bridge over R. Regnitz	—

Distance from WÜRZBURG Miles	Kms.	Station	Engineering Works	Details and Facilities
58½	94·5	FÜRTH (BAY.) (Main Station)	—	Wb (41 t.). Cr (15 t.). SER.
59½	96·0		—	J (facing) right, with avoiding line to MY.
			Bridge over Ludwigs canal	Just before reaching Nürnberg —Doos station.
60½	96·8	NÜRNBERG—DOOS	—	Wb (40 t.) SER.
60½	97·2		Bridge over railway	Line crosses DT line from Nürnberg (N.) to MY.
61½	98·7	NÜRNBERG NEUSÜNDERSBÜHL	—	Passenger halt.
62½	100·1	NÜRNBERG— ROTHENBURGERSTRASSE	—	Passenger halt.
62½	100·5		—	J (triangular) right, with— (1) DT n.o. line to Ansbach (Route 74). (2) DT electric line to Treuchtlingen and München (Route 87). (3) DT line to MY.
63½	102·2	NÜRNBERG	—	Main station. SER. Wb (48 t.). Cr (20 t.). ES (E. of station), large rectangular. RpS (locos., passenger and goods rolling stock). Total employees 1,728 (including operating staff at MY).

NÜRNBERG (Main Station) to MY and NÜRNBERG (South)

Distance from MAIN STATION				
1½	2·8	NÜRNBERG (SOUTH)	—	Goods only. SER. Wb (40 t.). Cr (18 t.).
3½	5·9	NÜRNBERG (RANGIERBF)	—	MY—capacity 2,000 wagons per 24 hours. 2 ES (roundhouse) large.

ROUTE 91

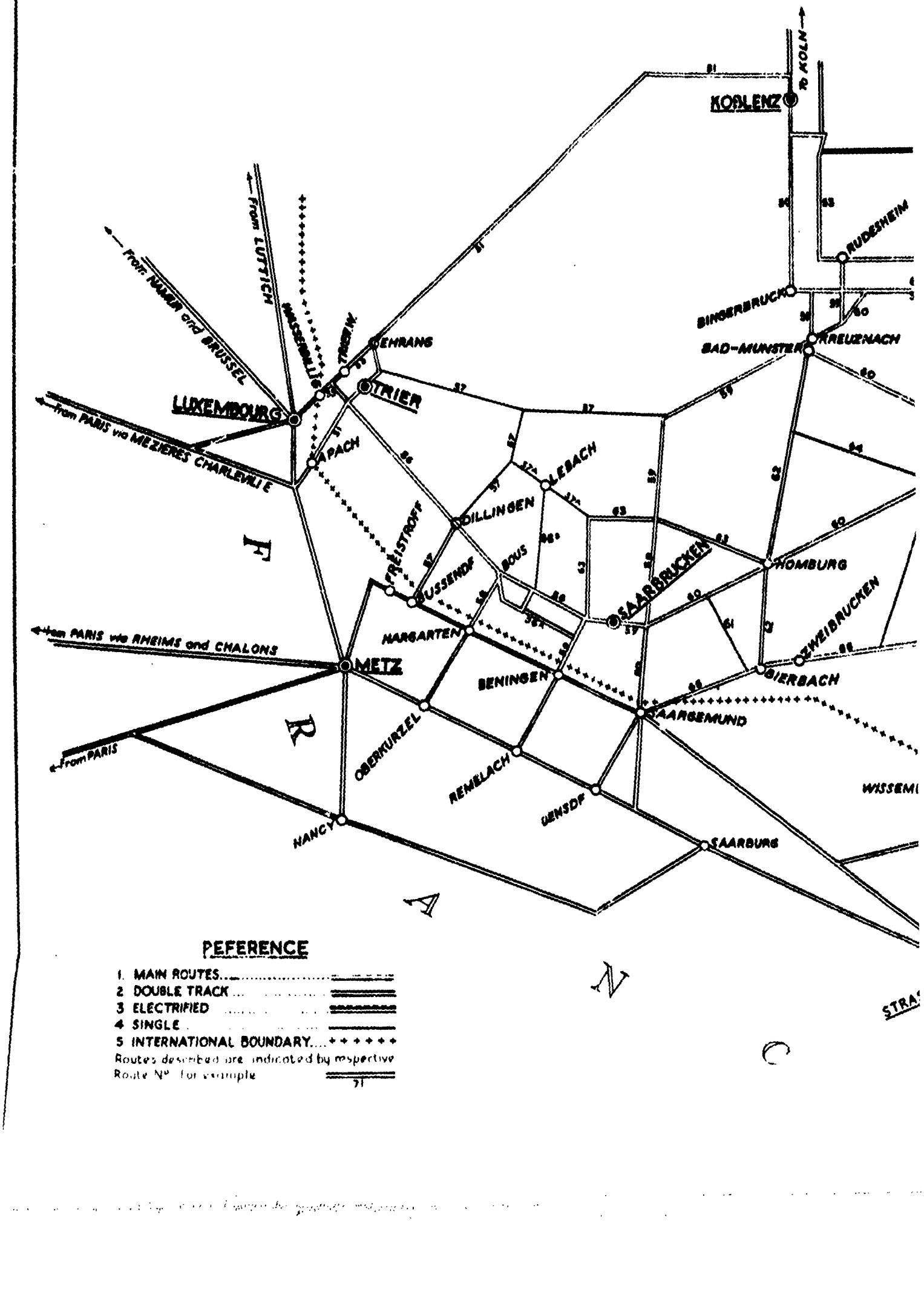
NÖRDLINGEN—DOMBÜHL

General Details

1. *Gauge :* 1435 mm. (Standard.)
2. *Length :* 54·1 km. (33½ miles).
3. *Track :* Single.
4. *Maximum permissible axle load :* 16 metric tons.
5. *Gradients :* No detailed information. Spot heights, taken from maps, are indicated where known.
6. *Curvature :* No details available.
7. *Traction :* Steam throughout.
8. *Maximum distance between stations :* 6·7 kms. (4 miles).
9. *Marshalling Yards (MY) :* None.
10. *Engine sheds (ES) :* NÖRDLINGEN.
11. *Watering facilities (W) :* No details available.
12. *Vulnerable points :*
    (*a*) Locomotive facilities at NÖRDLINGEN.
    (*b*) Junctions at NÖRDLINGEN and DOMBÜHL.
13. *Capacity :* 20 trains per day each way, of 300 tons net train load each.

Distance from NÖRDLINGEN

Miles	*Kms.*	*Station*	*Engineering Works*	*Details and Facilities*
0	0	NÖRDLINGEN (430 m.)	—	Wb (40 t.). SER. ES.
0	0·2		Bridge over road	—
¼	0·4		—	J (facing) left, with ST s.o. line to Goldshöfe (Route 79).
½	0·6		—	J (facing) right, with ST s.o. line to Günzenhausen (Route 89).
2½	4·3	WALLERSTEIN (436 m.)	—	SER.
5½	8·9	MARKTOFFINGEN	—	Wb (30 t.). SER.
7½	12·3	BÜHLINGEN	—	Passenger station only.
9	14·6	FREMDINGEN	—	Wb (30 t.). SER.
11½	18·4	RÖHLINGSTETTEN	—	Passenger station only.
11¾	18·9		Bridge over road	—
13½	22·1		Bridge over road	—
14¾	23·0	WILBURGSTETTEN	—	Wb (30 t.). SER.
14¾	23·8		Bridge over R. Wörnitz	—
			—	Line runs in valley of R. Wörnitz to Schopfloch.
16	25·6		Bridge over road	—
16½	26·6	KNITTELSBACH	—	Passenger station only.
18¼	29·5		Bridge over road	—
18¾	30·3	DINKELSBÜHL	—	Wb (40 t.). SER.
19	30·7		Bridge over road	—
20¾	33·4	LEHENGÜTINGEN	—	Passenger station only.
22½	36·7	SCHOPLOCH (MITTELFR.)	—	Wb (30 t.). SER (less than 7 m. long).
26¾	43·0	FEUCHTWANGEN	—	Wb (30 t.). SER.
27½	44·2		Bridge over road	—
			Bridge over stream	—
29¾	47·9	DORFGÜTINGEN	—	Restricted goods facilities.
31½	50·8	VELBERG		Passenger halt.
				J (trailing), with DT s.o. line from Nürnberg (Route 74) just before Dombühl station.
	54·1	DOMBÜHL		Wb (40 t.). SER.



PEFERENCE

1. MAIN ROUTES.....
2. DOUBLE TRACK.....
3. ELECTRIFIED.....
4. SINGLE.....
5. INTERNATIONAL BOUNDARY.....

Routes described are indicated by respective Route N° for example 31

FIG. 1.

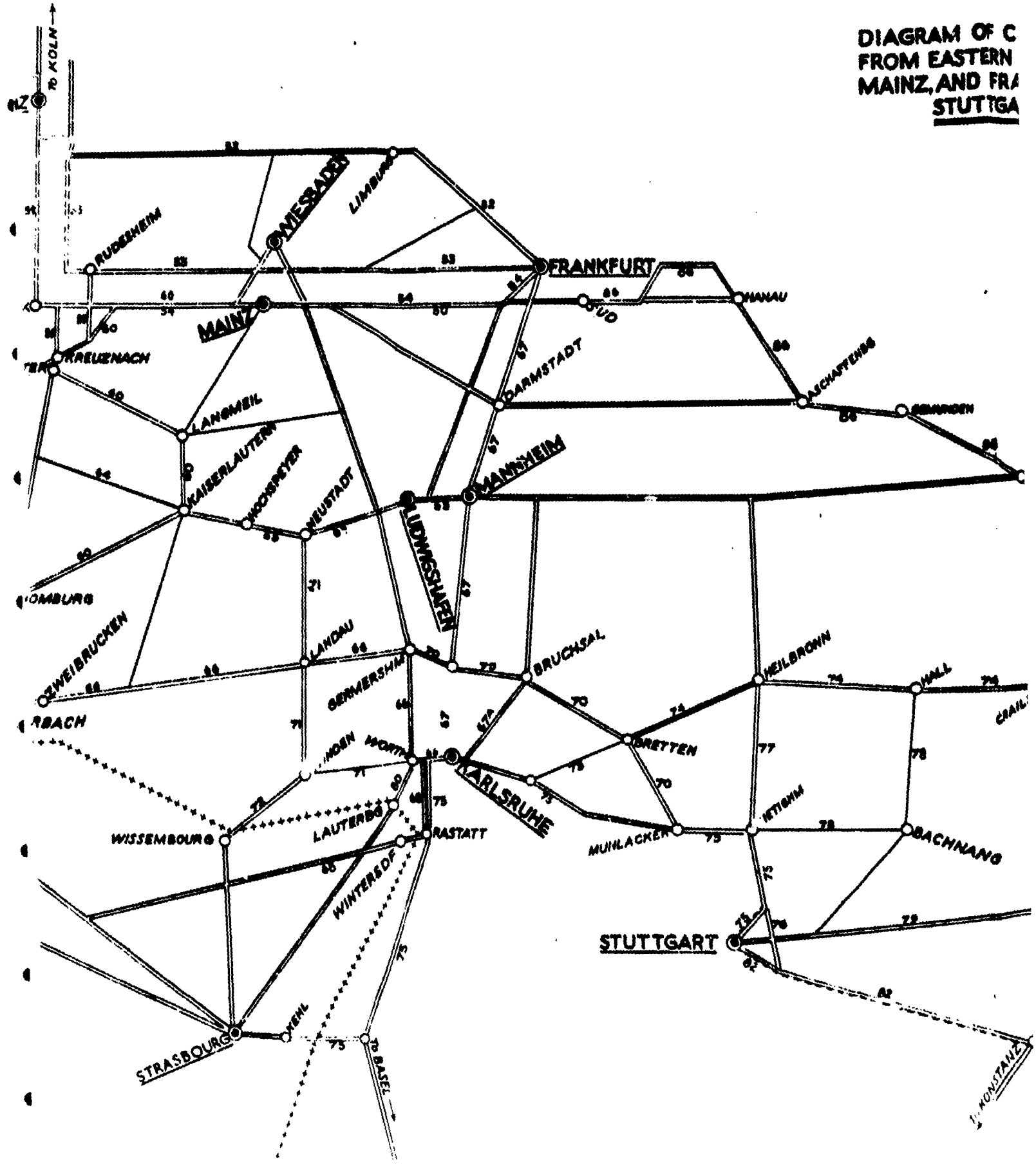


DIAGRAM OF C
FROM EASTERN
MAINZ, AND FRA
STUTTGA
TO KOLN
WIESBADEN
LIMBURG
RUDESHEIM
FRANKFURT
HANAU
MAINZ
KREUZNACH
LANGMEIL
DARMSTADT
ASCHAFFENBG
ERLANGEN
KAISERLAUTERN
MANNHEIM
NEUSTADT
LUDWIGSHAFEN
OMBURG
ZWEIBRUCKEN
LANDAU
BRUCHSAL
HEILBRONN
HALL
GERMERSHM
RBACH
BRETTEN
KARLSRUHE
RASTATT
WISSEMBOURG
LAUTERBG
MUHLACKEN
BACHNANG
WINTERSDF
STUTTGART
STRASBOURG
KEHL
TO BASEL
KONSTANZ

FIG. 1.

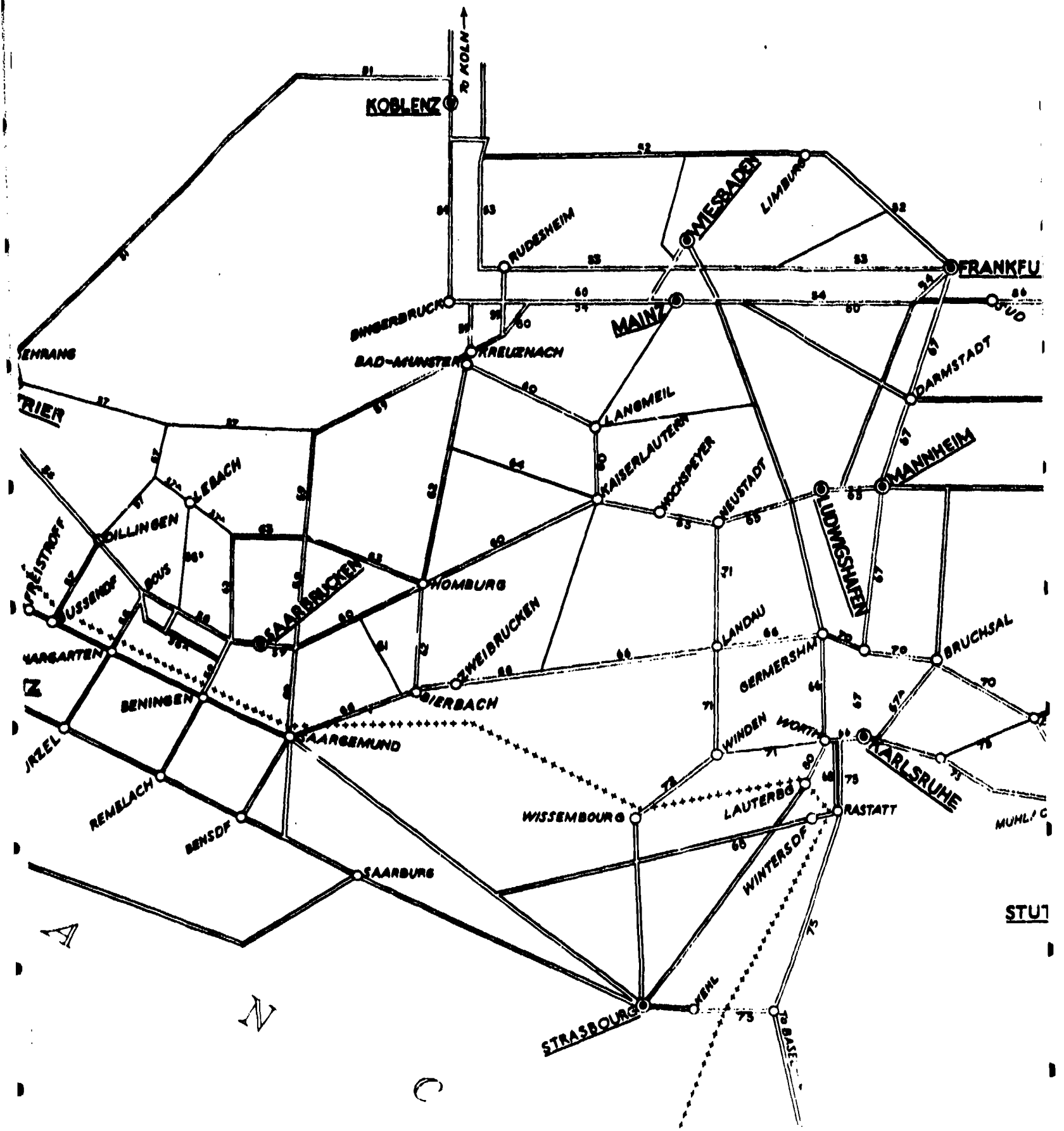
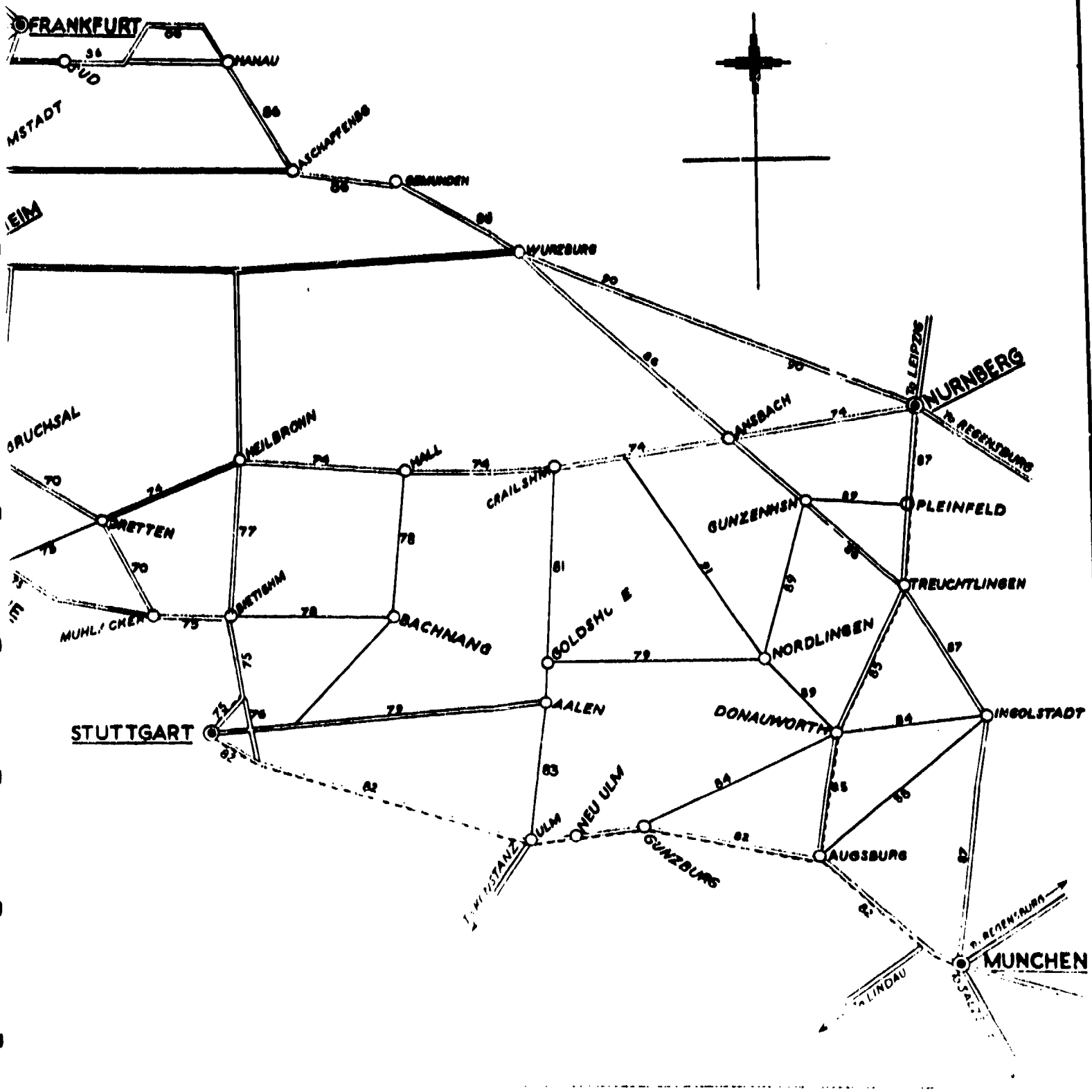

TO KOLN
KOBLENZ
WIESBADEN
LIMBURG
RUDESHEIM
FRANKFU
MAINZ
BINGERBRUCK
BAD-MUNSTER
KREUZNACH
DARMSTADT
TRIER
LANGMEIL
KAISERLAUTERN
MANNHEIM
LEBACH
HOCHSPEYER
NEUSTADT
LUDWIGSHAFEN
DILLINGEN
HOMBURG
SAARBRUCKEN
ZWEIBRUCKEN
LANDAU
BRUCHSAL
BENINGEN
BIERBACH
GERMERSHM
SAARGEMUND
WINDEN
KARLSRUHE
REMELACH
WISSEMBOURG
LAUTERBG
RASTATT
BENSDF
WINTERSDF
SAARBURG
STRASBOURG
KEHL
TO BASE
STU

DIAGRAM OF CERTAIN ROUTES WITH APPROACHES FROM EASTERN FRANCE TO (i) KOBLENZ, WIESBADEN, MAINZ, AND FRANKFURT (ii) THE SAAR, KARLSRUHE, STUTTGART, MUNCHEN AND NURNBERG.



A [illegible].

Bridges over the R. Rhine.

Route 65. Km. 61.4 Between Ludwigshafen and Mannheim.
Road and railway bridge over River Rhine.
Total length 278 m., made up as follows:-

(a) Over main stream. 3 spans of 91.3 m. C-to-C of supports, and 87.3 m. clear span (opening). Diamond lattice double track through spans.

(b) Flood openings. Left, 2 of 10 m. and 1 of 13 m. C-to-C supports, probably plate girder deck spans and may be separate for each track.

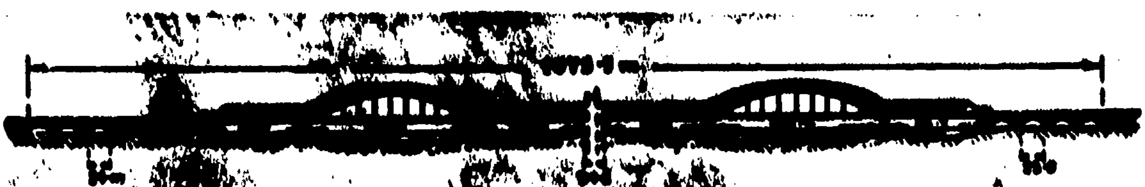
(c) Flood openings. Right. 1 of 16 m. and 1 of 14 m. C-to-C of supports, probably plate girder deck spans and may be separate for each track.

The Railway bridge is parallel to and alongside an older road bridge of Linville truss construction.
Both road and railway bridges have common piers.
Photograph shews Railway bridge under construction in 1932.

Route [illegible]. K. 3. . Between [illegible] and [illegible] Bad Cannstatt. [illegible]
[illegible]

Appendix 20

Bridges over the R. Rhine.



Railway Br[illegible]eisenheim.
"Hindenburg" [illegible]

Route Nr. [illegible] 1397B [illegible]
Double track railway bridge over [illegible] Called "Hindenburg" bridge.

Total length 1075.5 m., made up as follows:-

1. Over main stream, 7 spans.
   (a) 1 Warren girder, through, double track, span of 84.7 m., C-to-C of supports.

   (b) 1 arched Warren girder, through, double track, span with floor suspended by ties, 169.49 m. C-to-C of supports.

   (c) 1 Warren girder, through, double track, span of 92.55 m., C-to-C of supports.

   (d) 1 ditto of 94.20 m., C-to-C of supports.

   (e) Same as (c), above.

   (f) Same as (b), above.

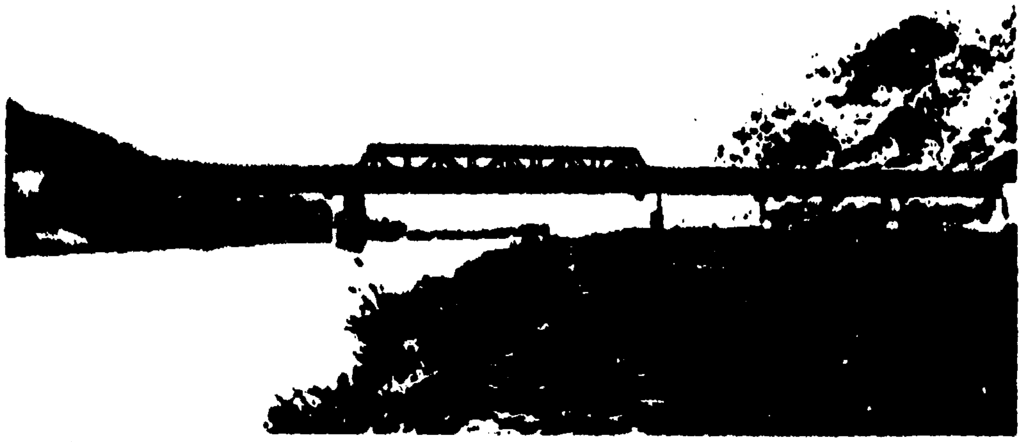
   (g) Same as (a), above.

2. Flood openings - left, 6 concrete or masonry arches of 24 m. span (opening).

3. Flood openings - right, 4 ditto of 23.5 m. span (opening). Constructed [illegible] prepared for demolition.

Appendix [illegible]

Bridges over the R. Rhine.



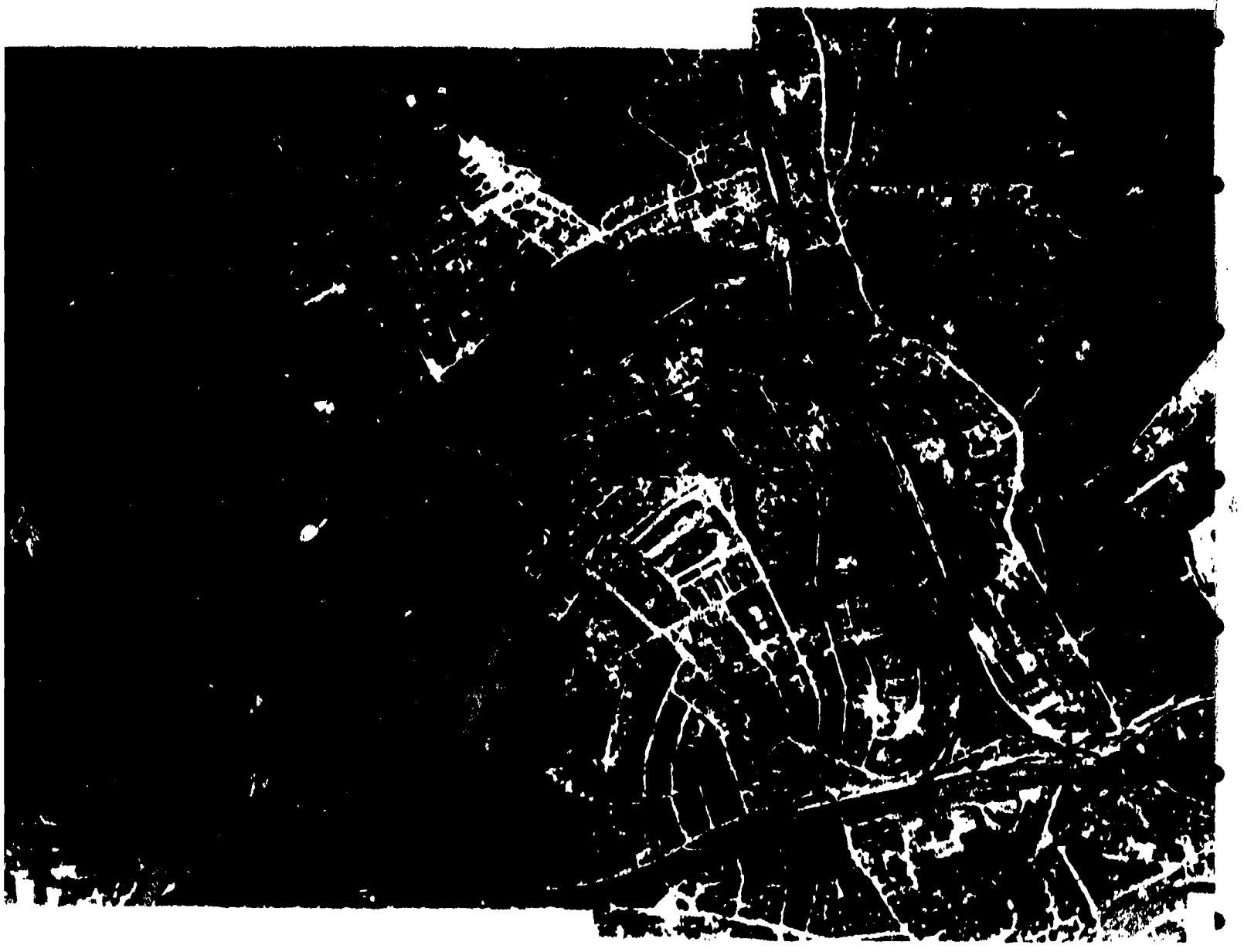
Route 51. Km. 52.5 between Trier and Pfalzel.
Double track railway bridge over River Mosel near Ehler, built in 1927.
Bridge consists of the following spans.-

1 braced half through double track steel span of 88 m, between supports.
5 approach gaps of 4 x 37 m. and 1 x 41.6 m. spanned by parallel single track continuous lattice deck girders.

Route 54. Km. [illegible] - Between Mainz Mombach and Biebrich-Ost. Railway bridge over River Rhine and island - Built 1904.

Total length 915 m., made up as follows:- Over left stream, [illegible] spans of [illegible] m. and 1 span of 1[illegible]7.[illegible], arched Pratt double track through girder spans with floor suspended by tie rods. Island, flood openings, [illegible] steel girder deck spans of [illegible] m. each. Over right stream, [illegible] spans of 11[illegible] [illegible] [illegible] floor suspended by the [illegible].

[illegible]


N
SAARBRÜCKE

RÜCKEN

ULM

N

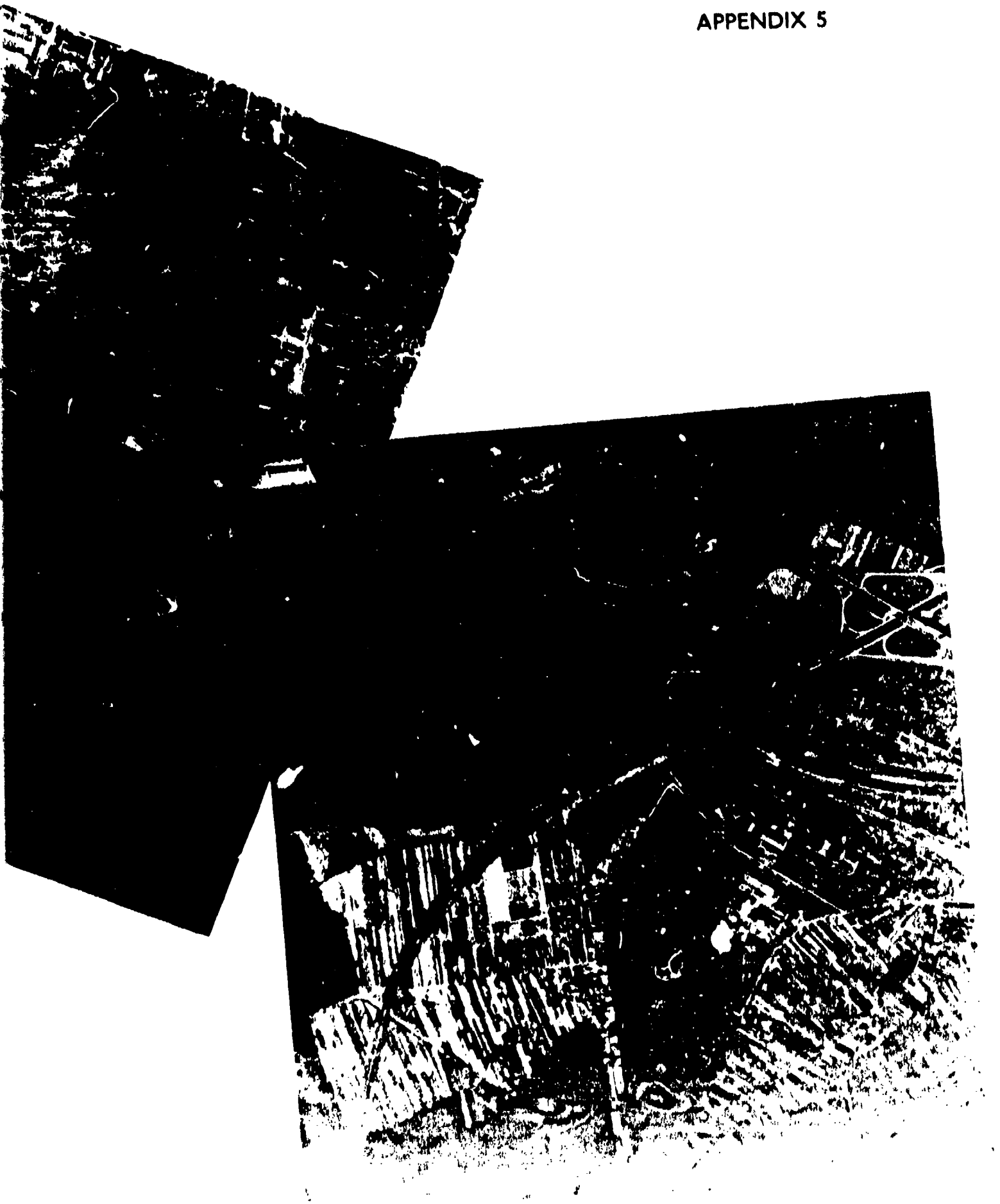
INGOLSTADT

APPENDIX 2

KARLSRUHE


N

APPENDIX 5



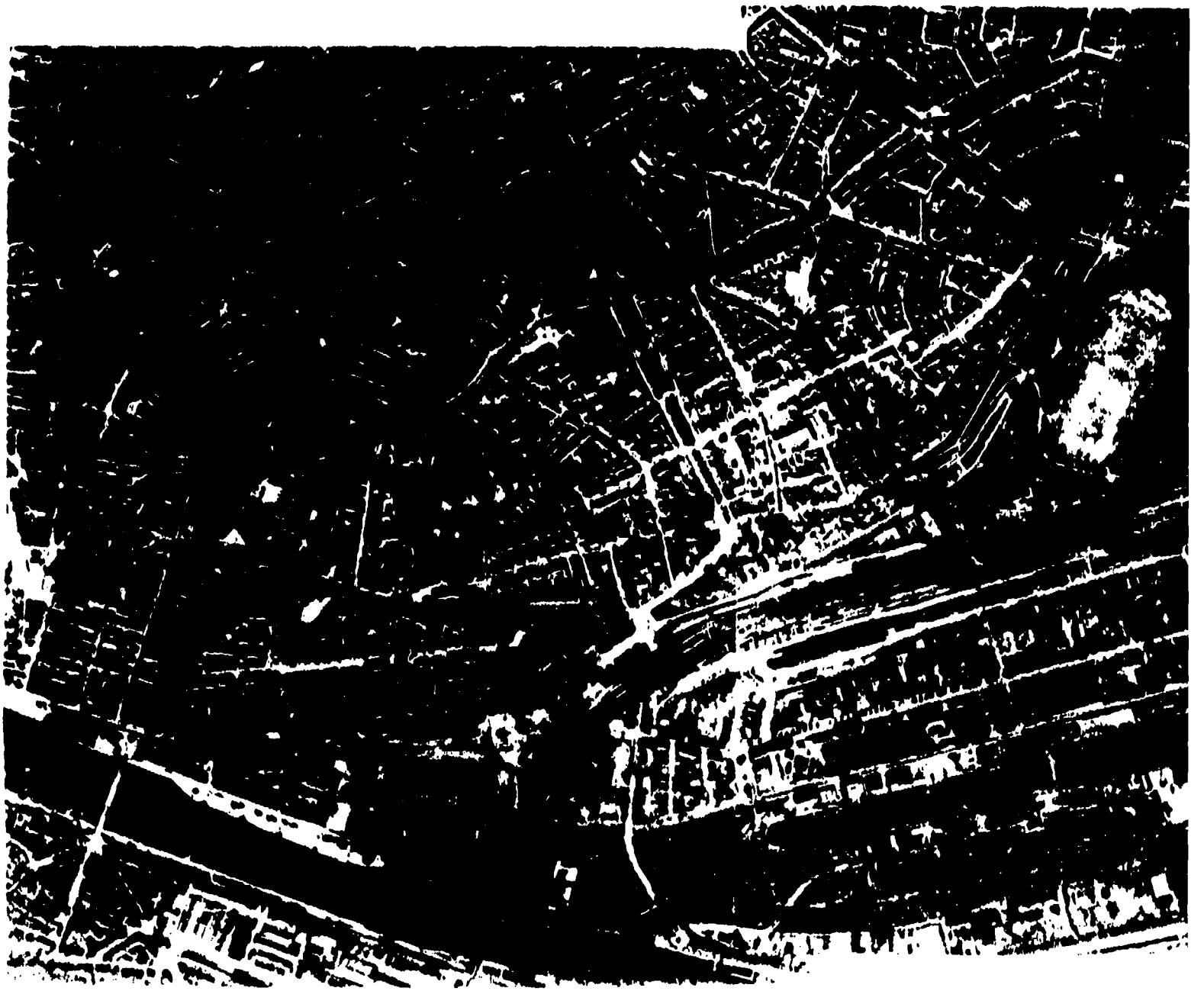
WIESBADEN

APPENDIX 19

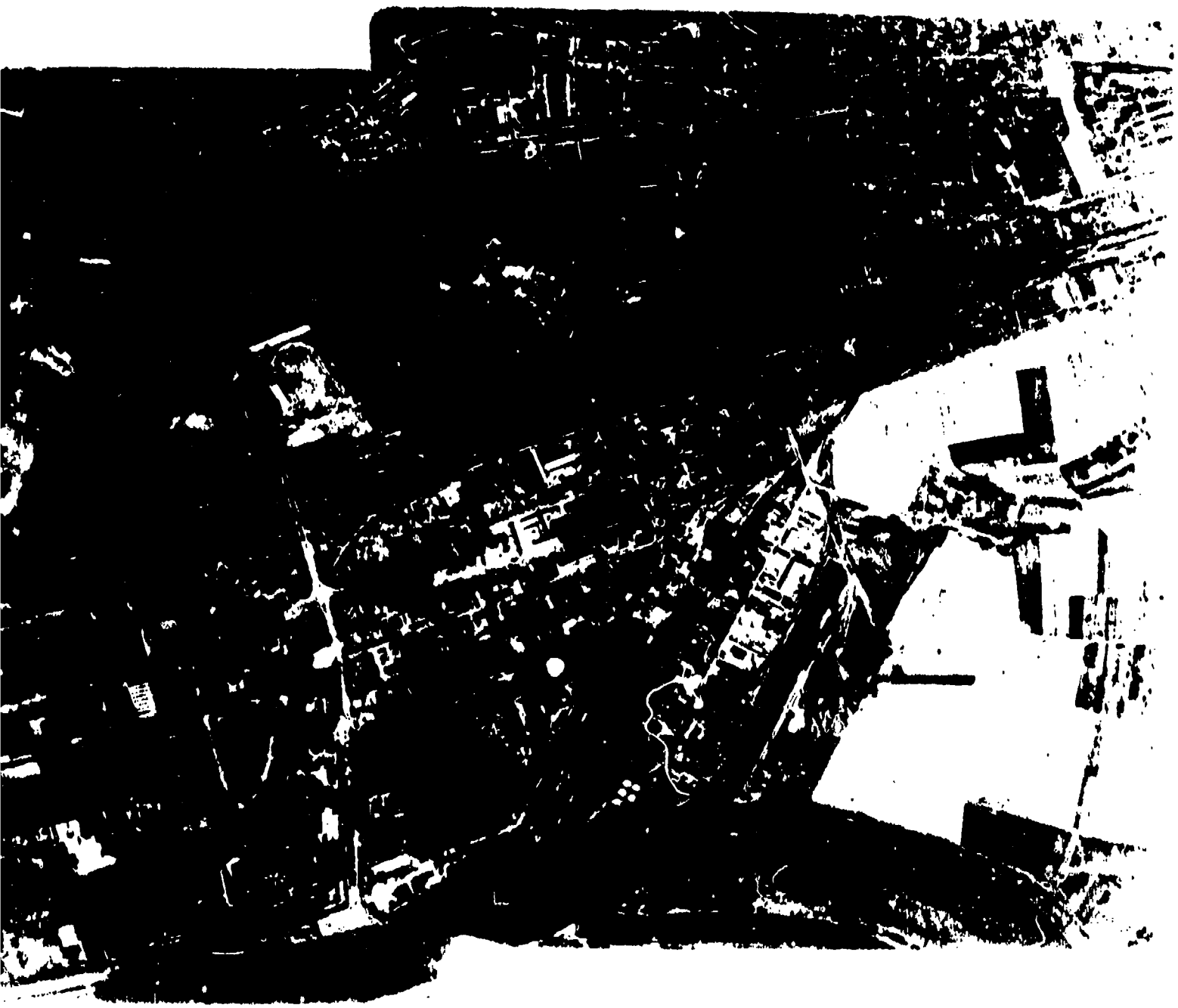
N

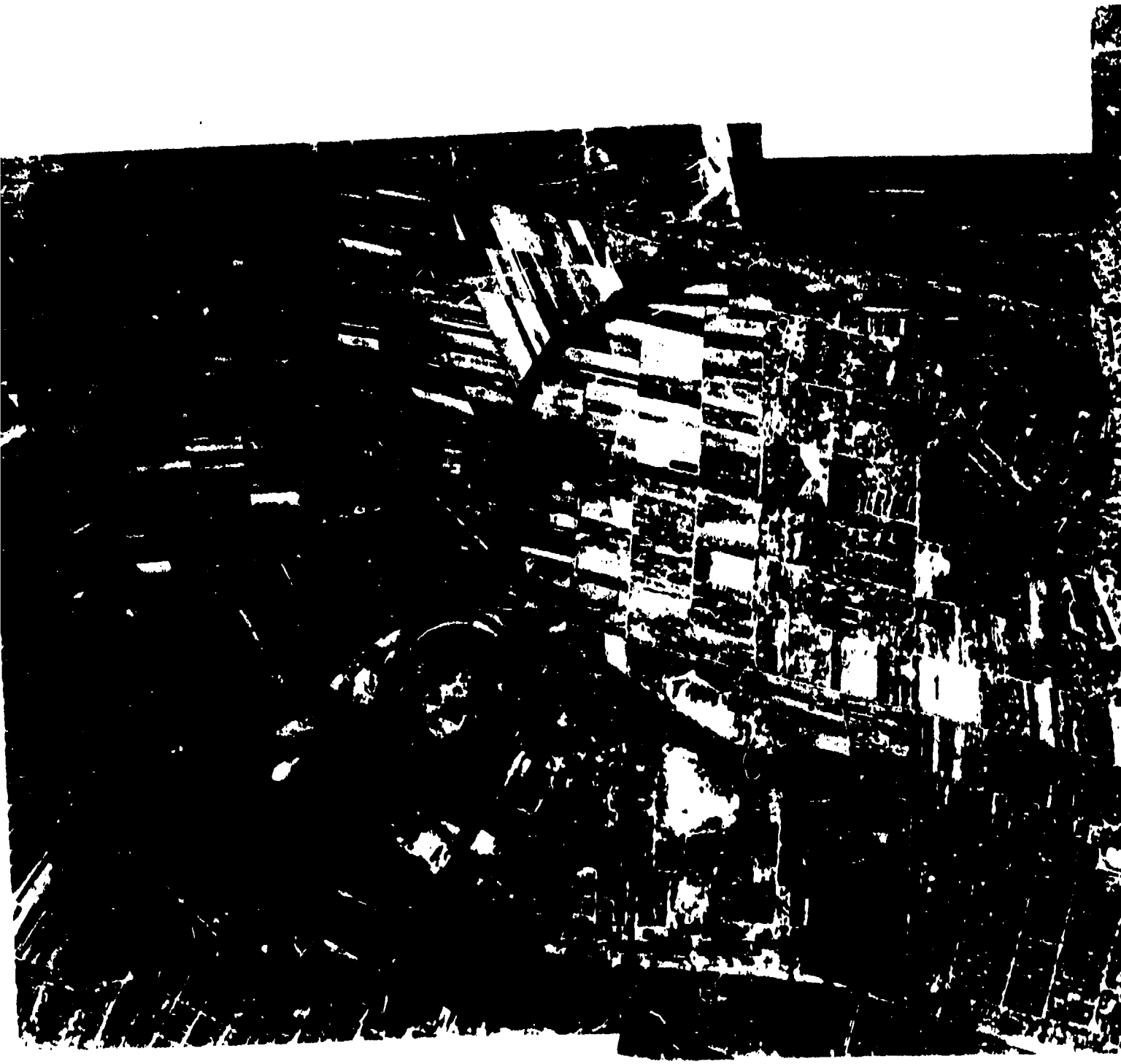
N

FRANKFURT OST

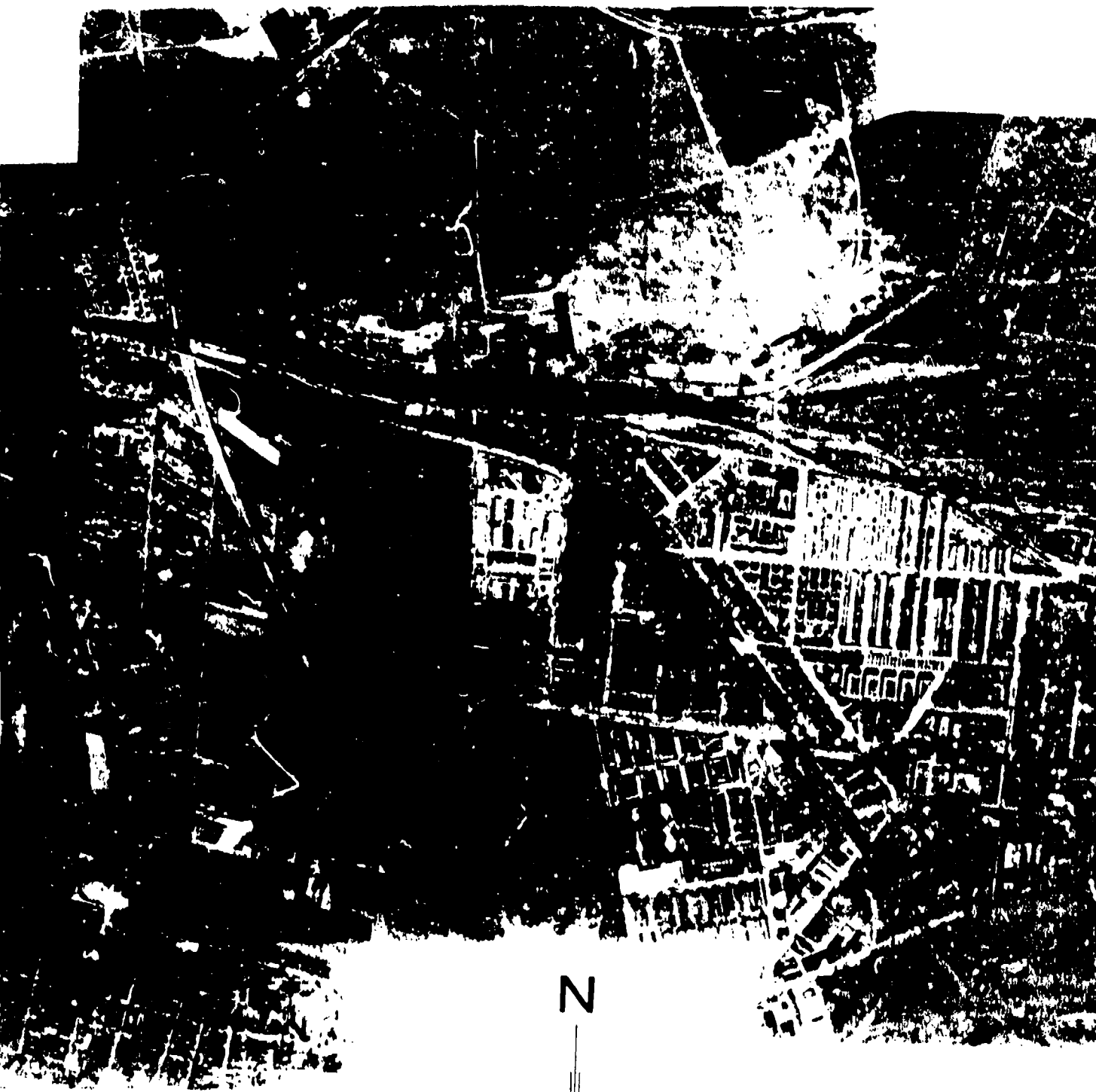


APPENDIX 18





FRANKFURT



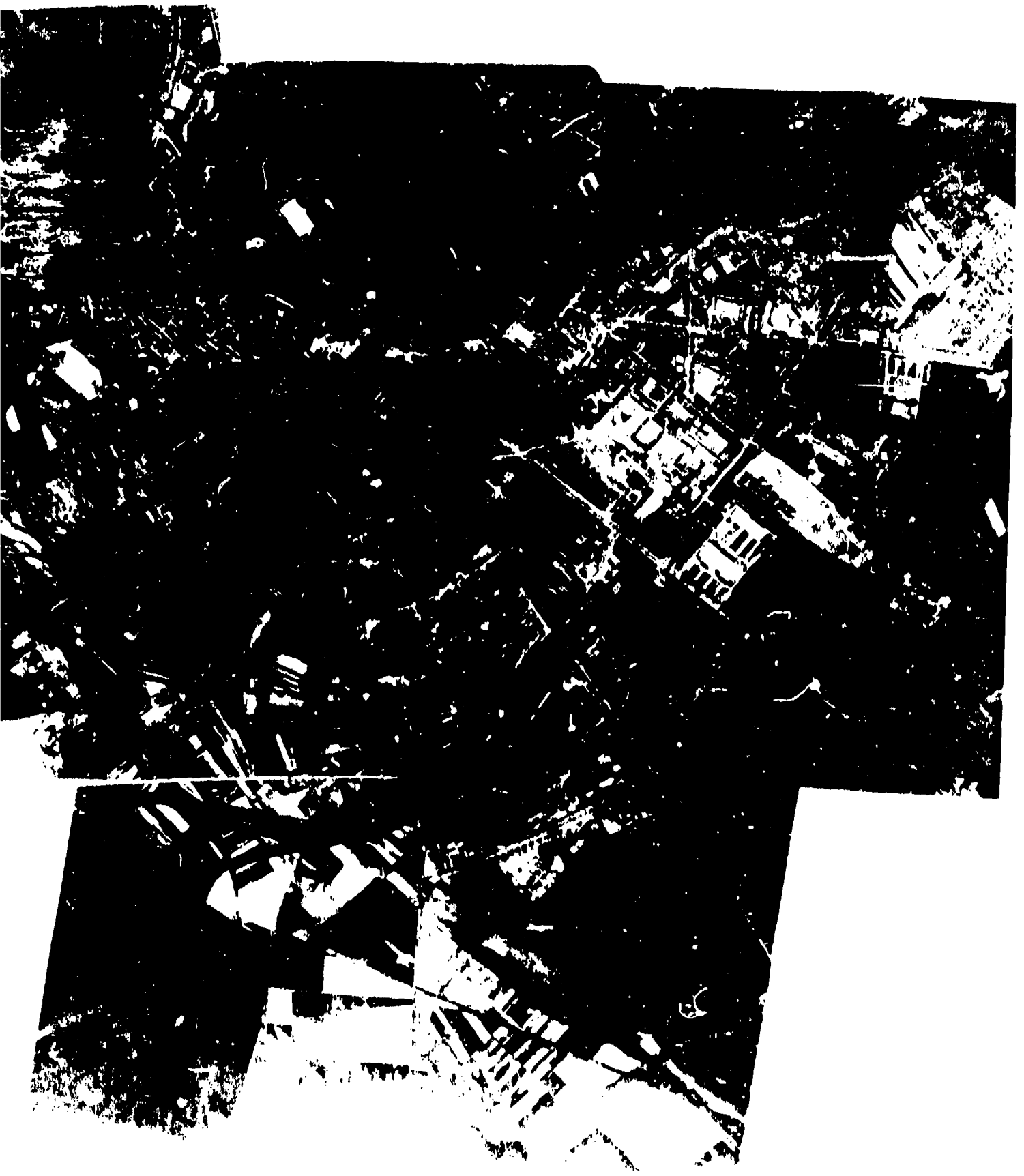
FRANKFU

FURT (Main)

ZWEIBRÜCKEN

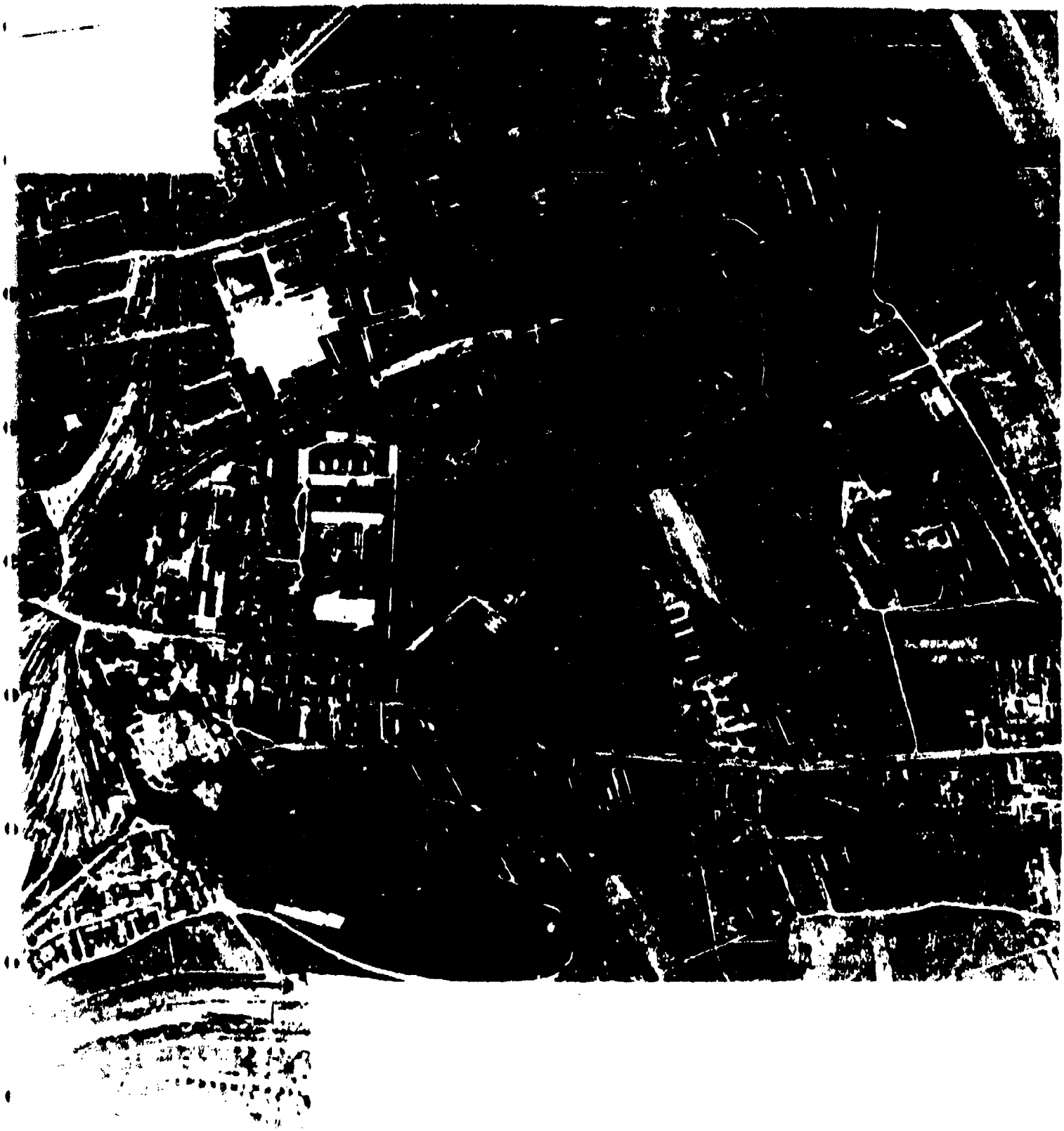
ANSBACH

N

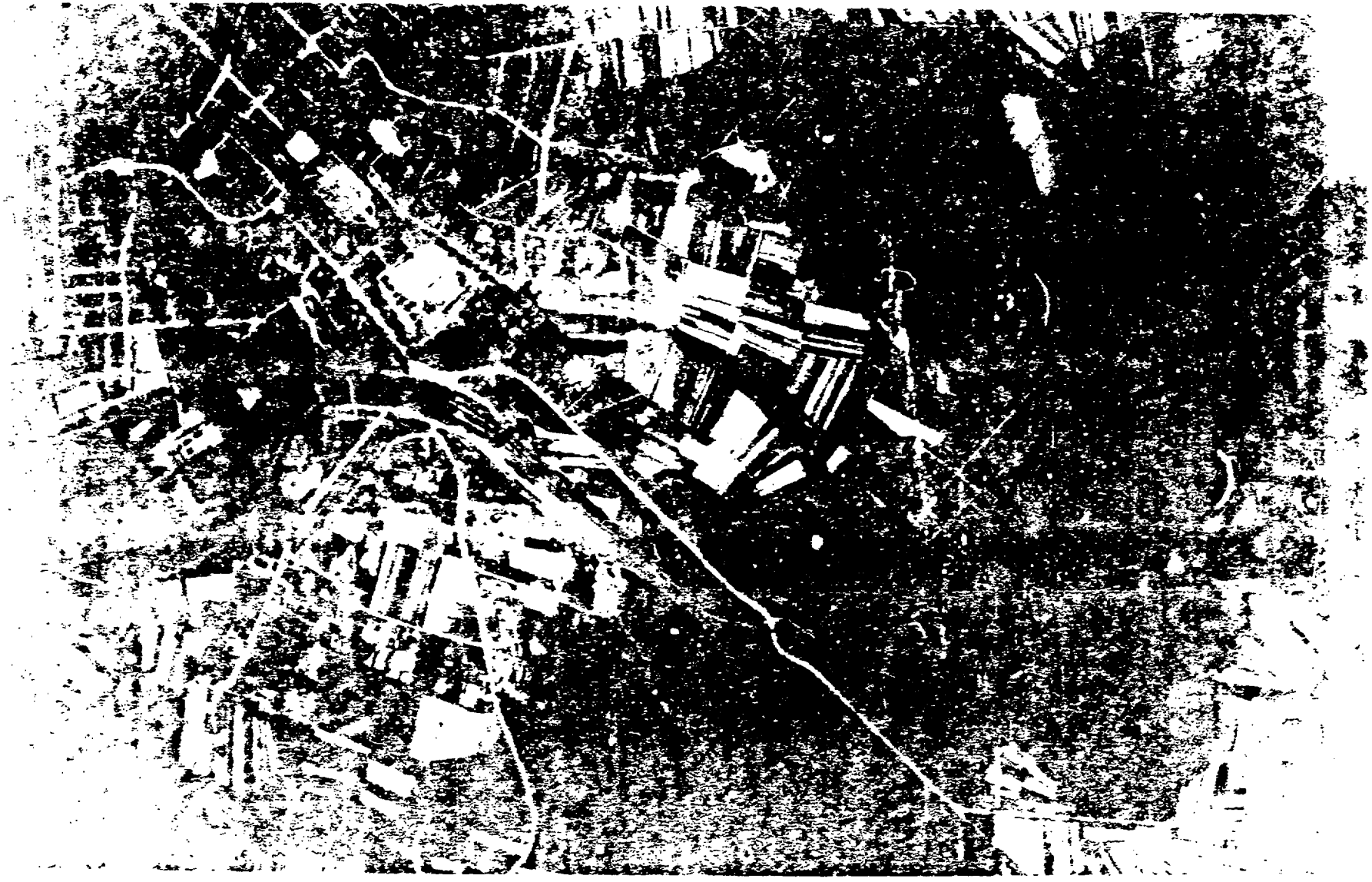


AUGSBURG

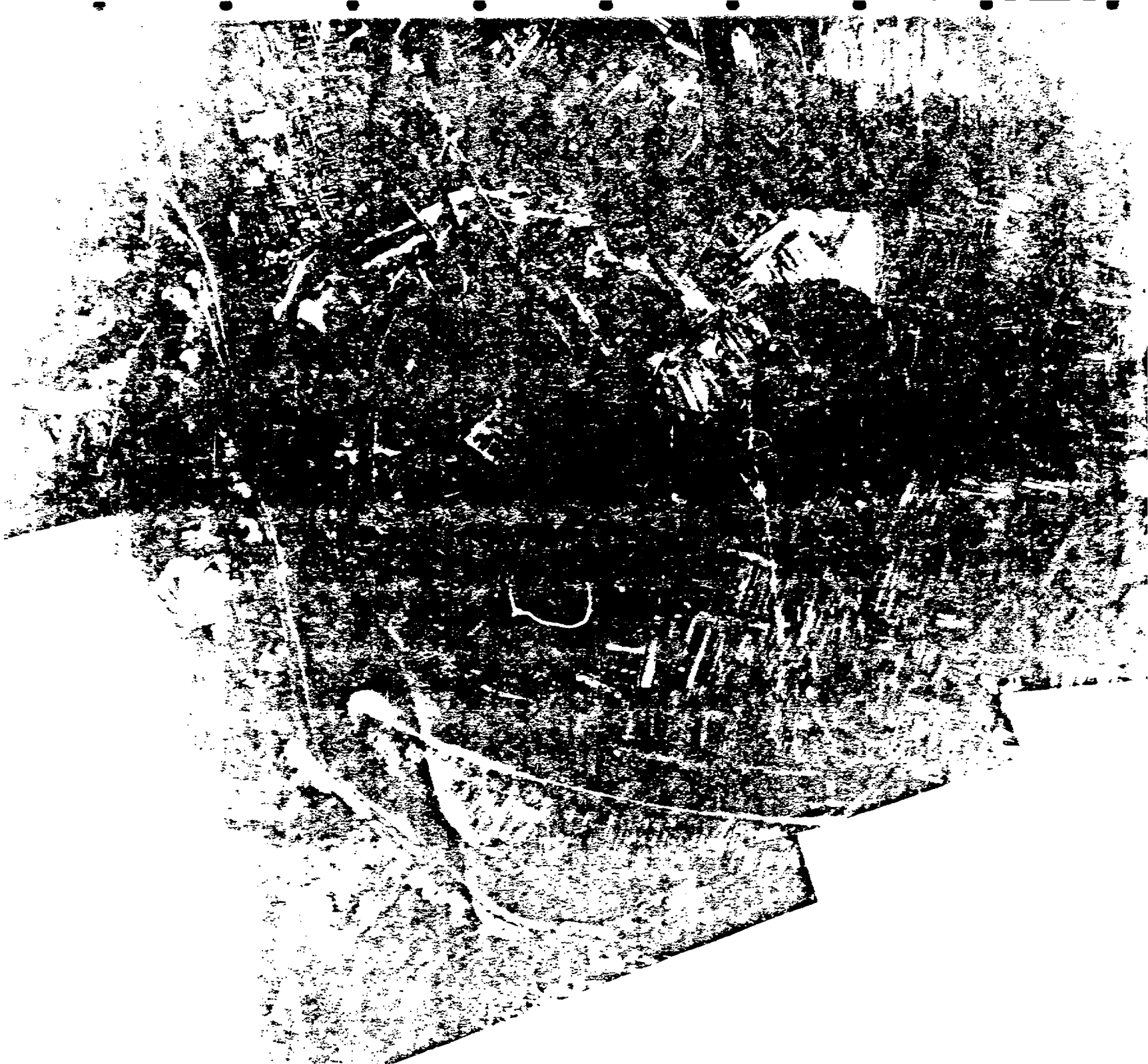
APPENDIX 12



RASTATT



KOBLENZ



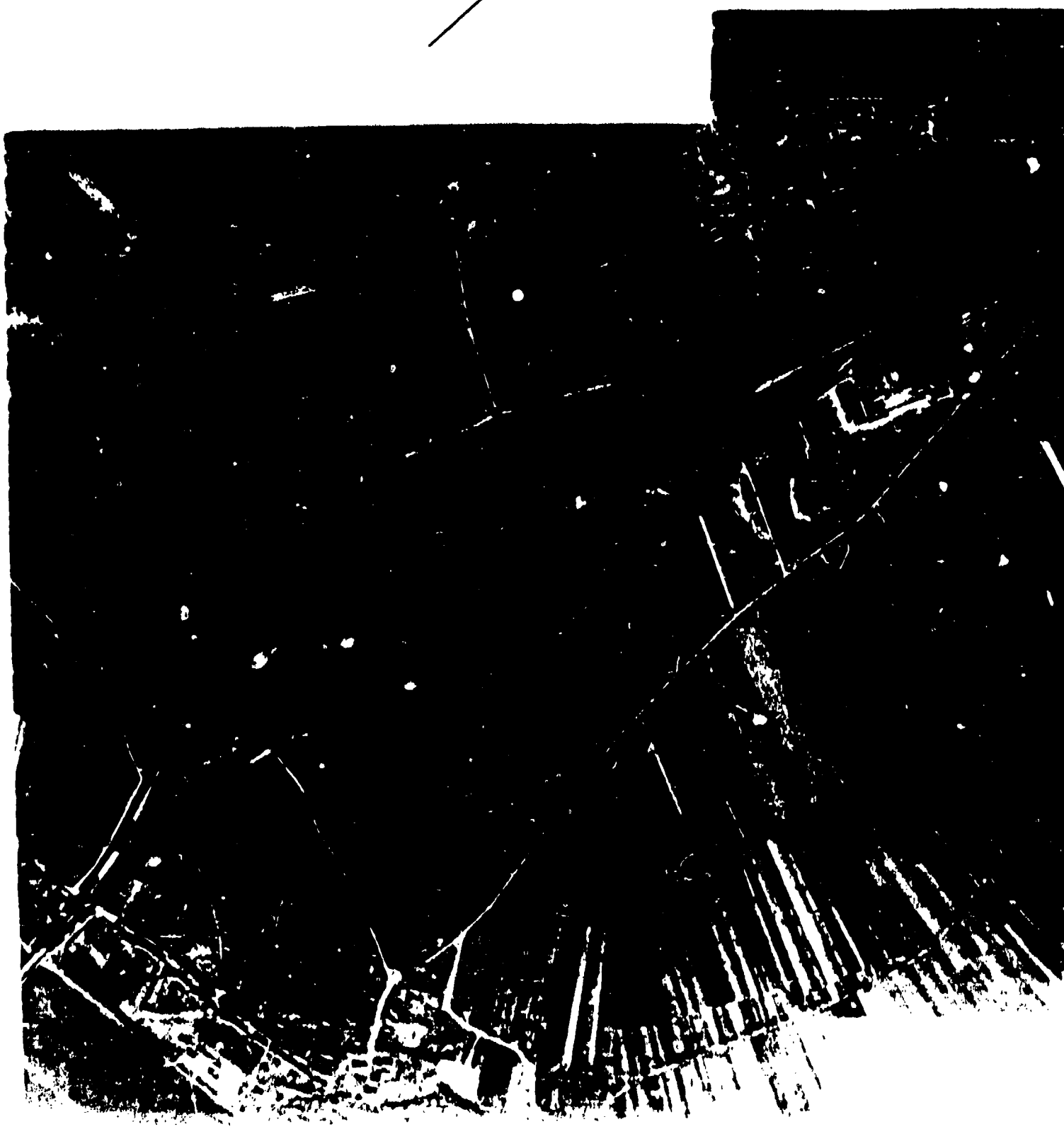
MANNHEIM

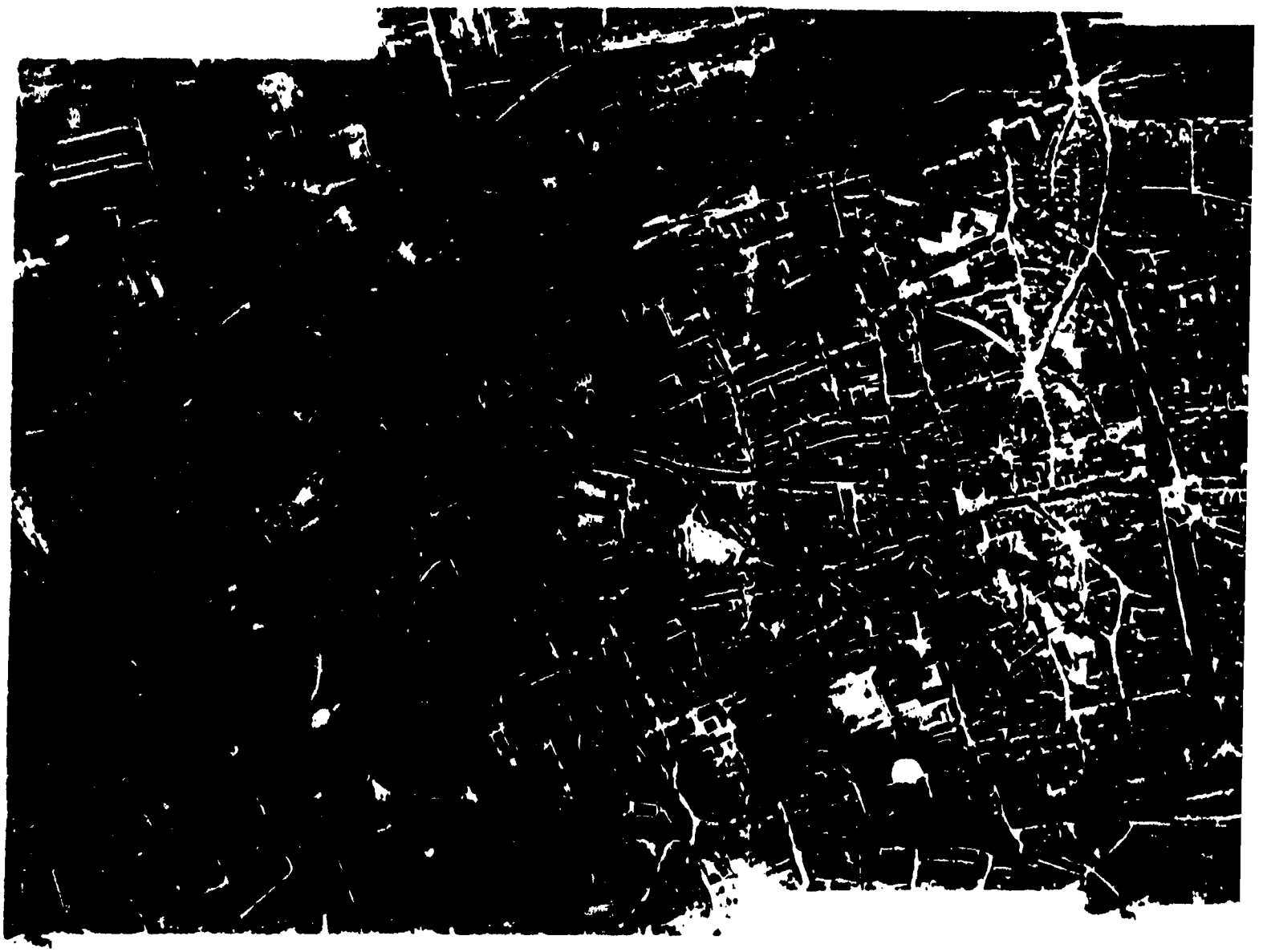
APPENDIX 10

LUDWIGSHAFEN

'IGSHAFEN

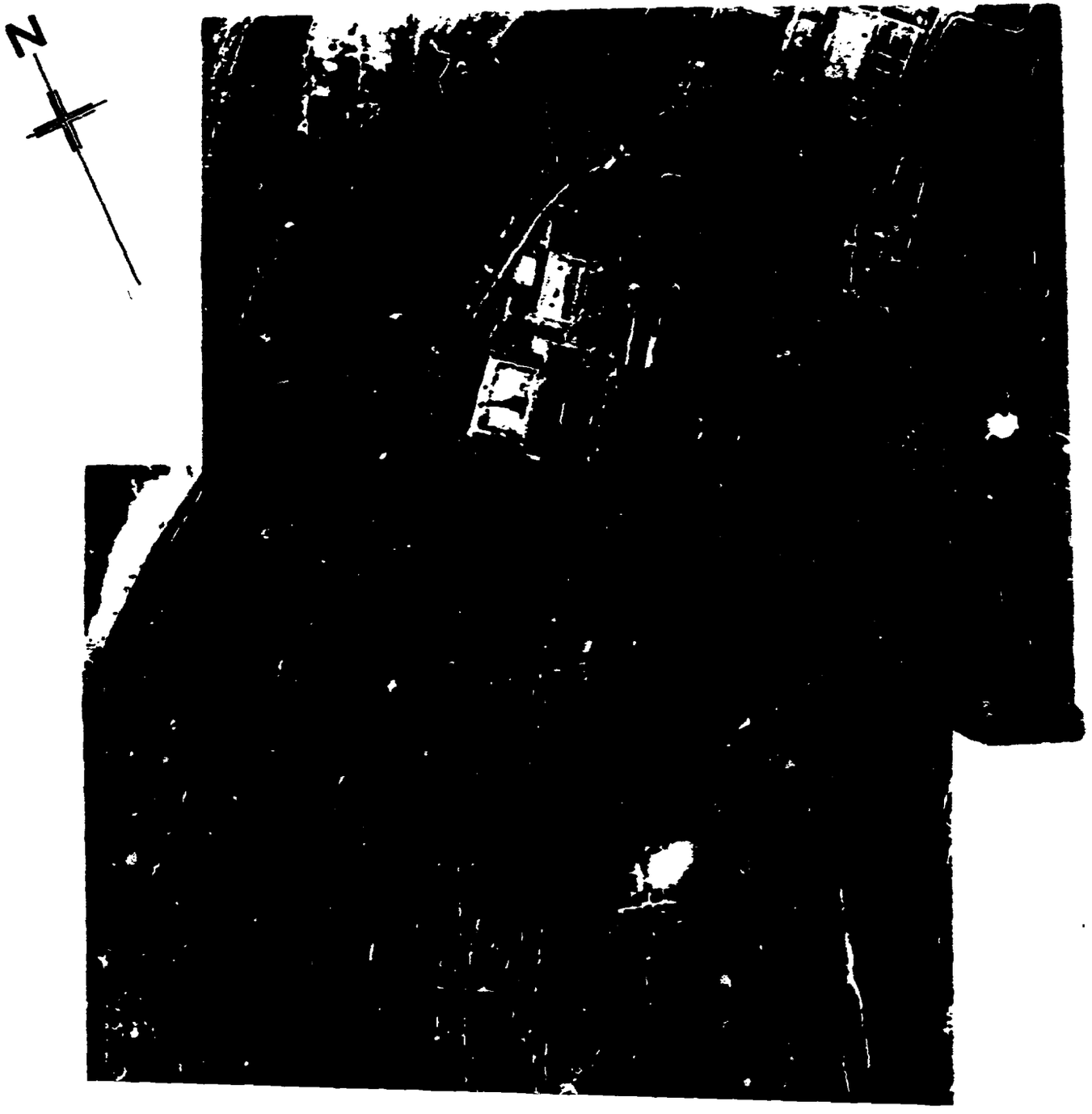
EHRANG





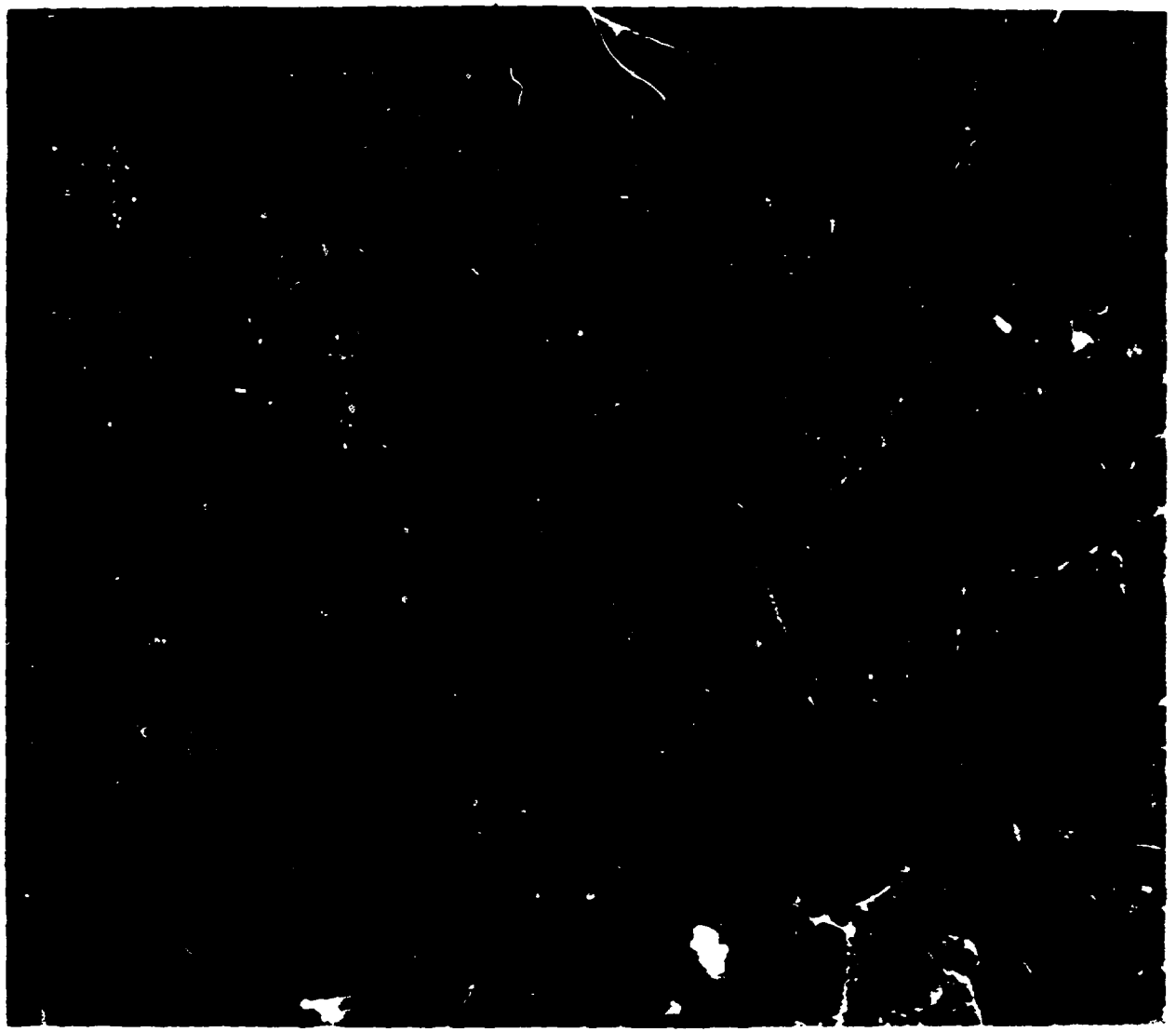
TRIER

APPENDIX 7



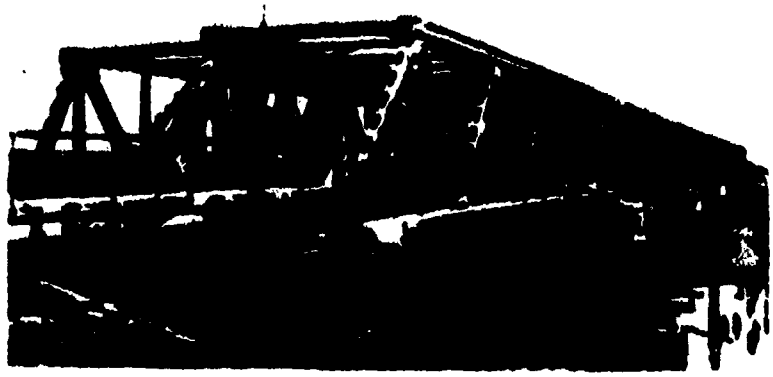
GUNZBURG

APPENDIX 6



Appendix 20.

Bridges over the R. Rhine.



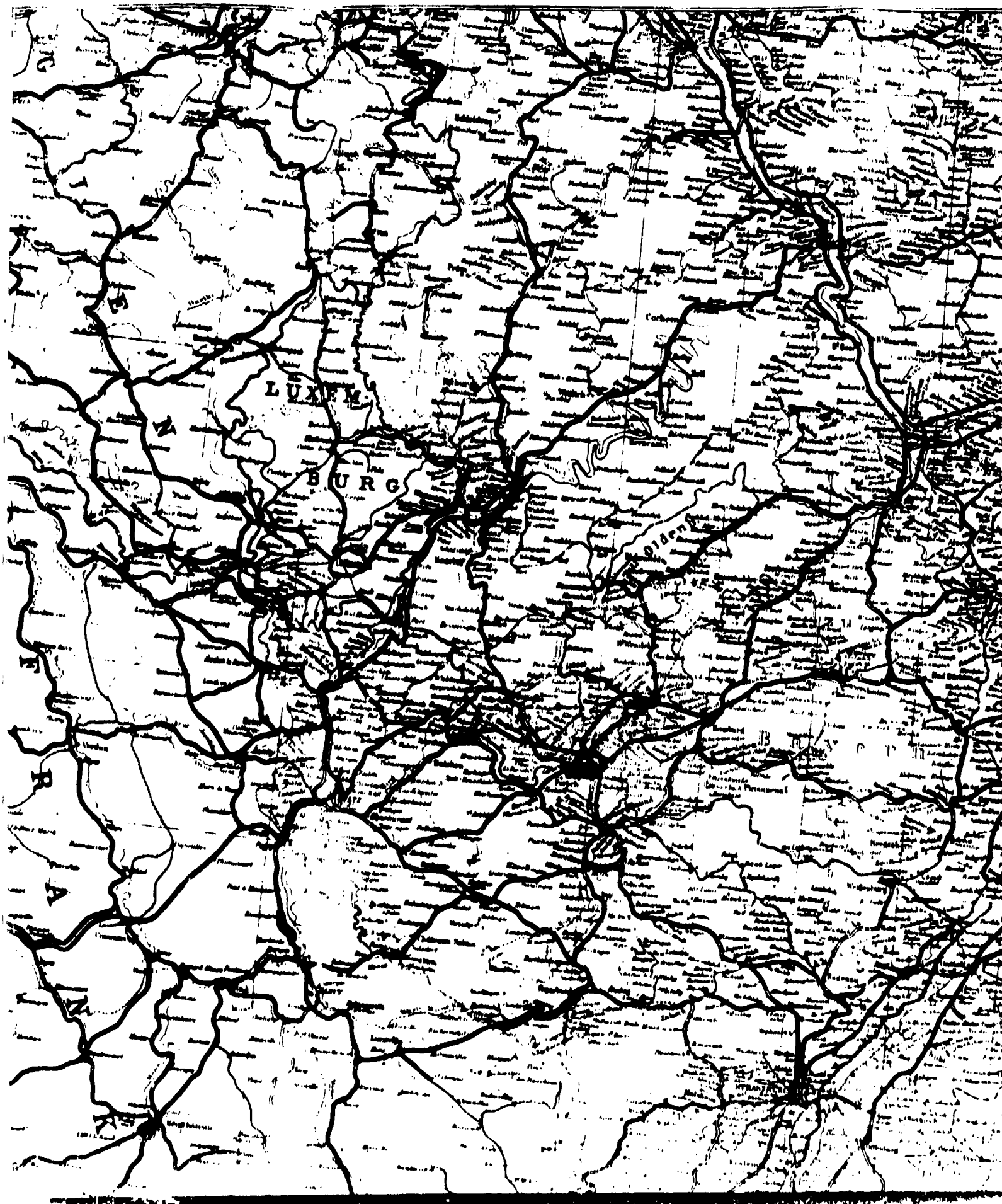
Route 86. Km. 1.6 "Deutschherrn" Bridge. Between Frankfurt Süd and Frankfurt Os .

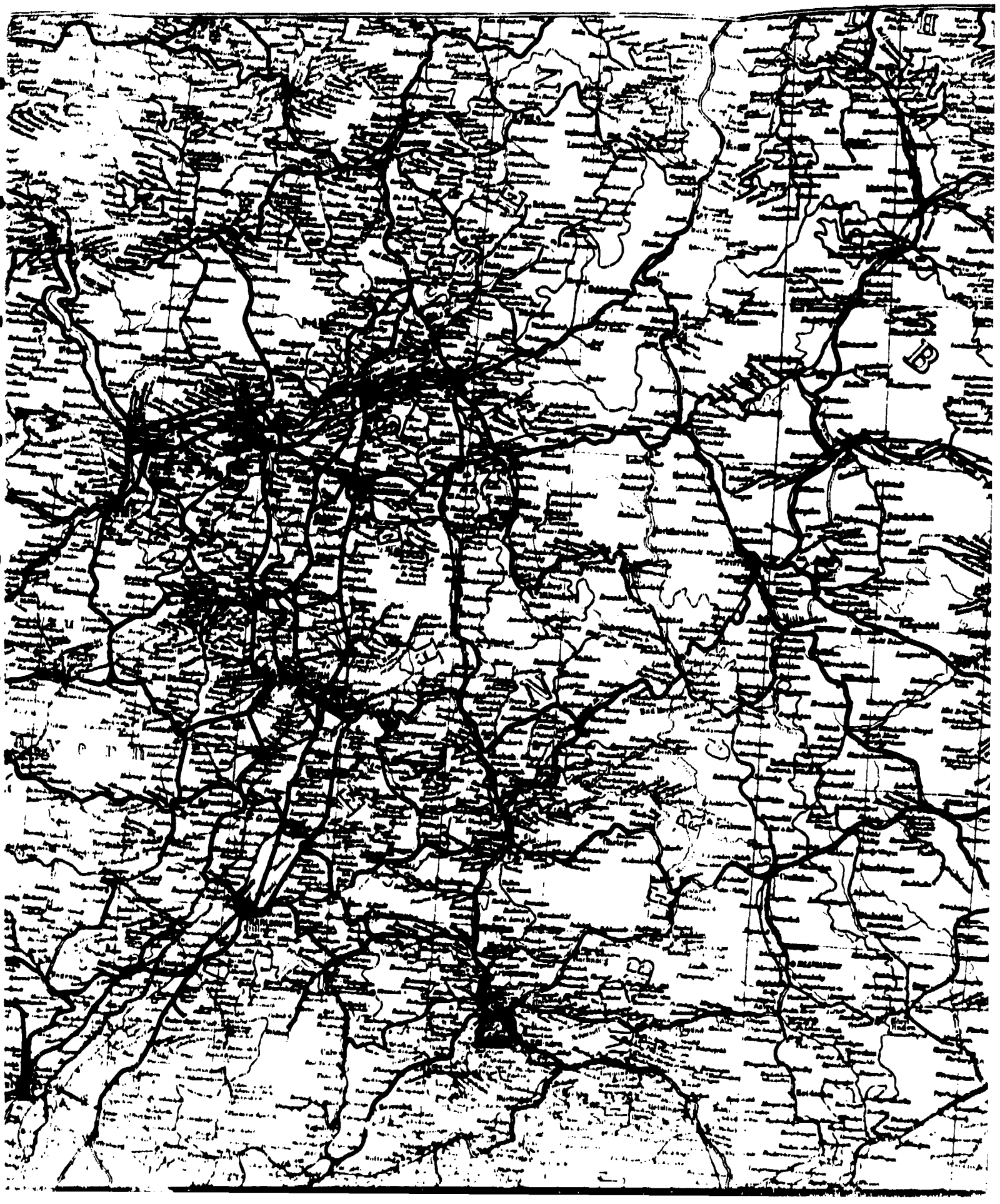
Four track bridge built in 1927.

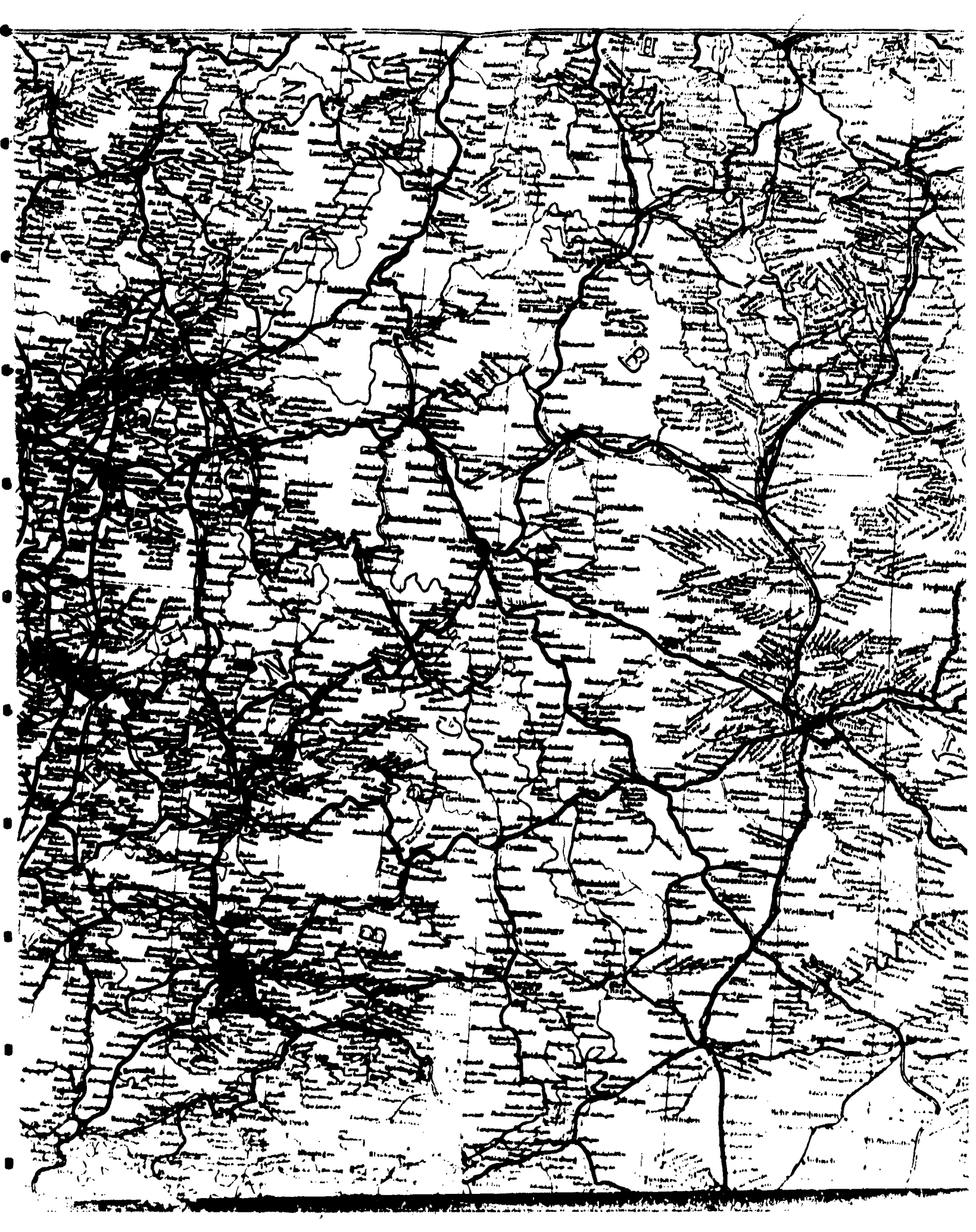
Total length 283.3 m. made up of 5 braced continuous Warren girder spans of 52.84 C-to-C of supports.

The bridge has a central girder which appears to be common to both pairs of tracks.

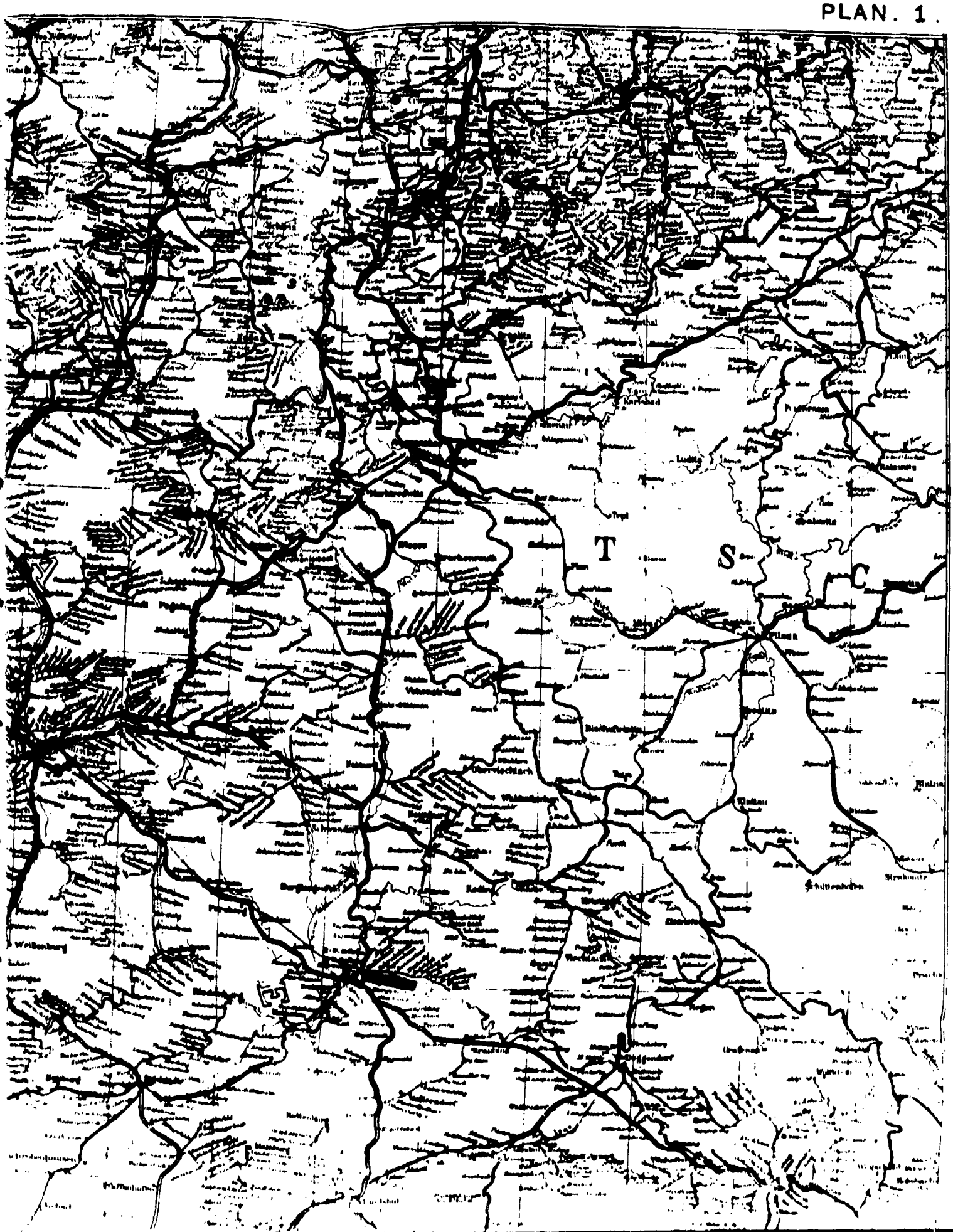
1STD/C/317.

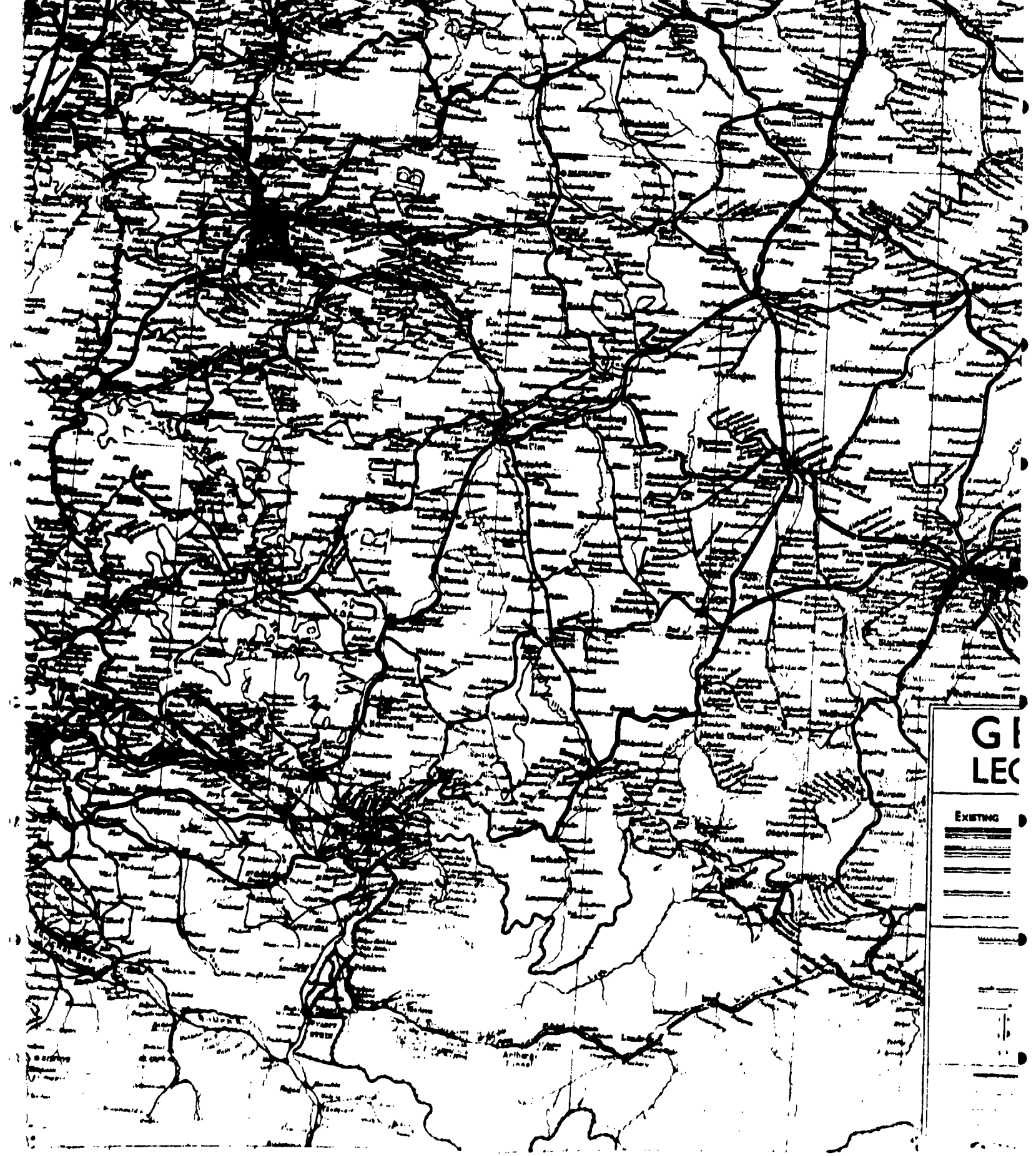


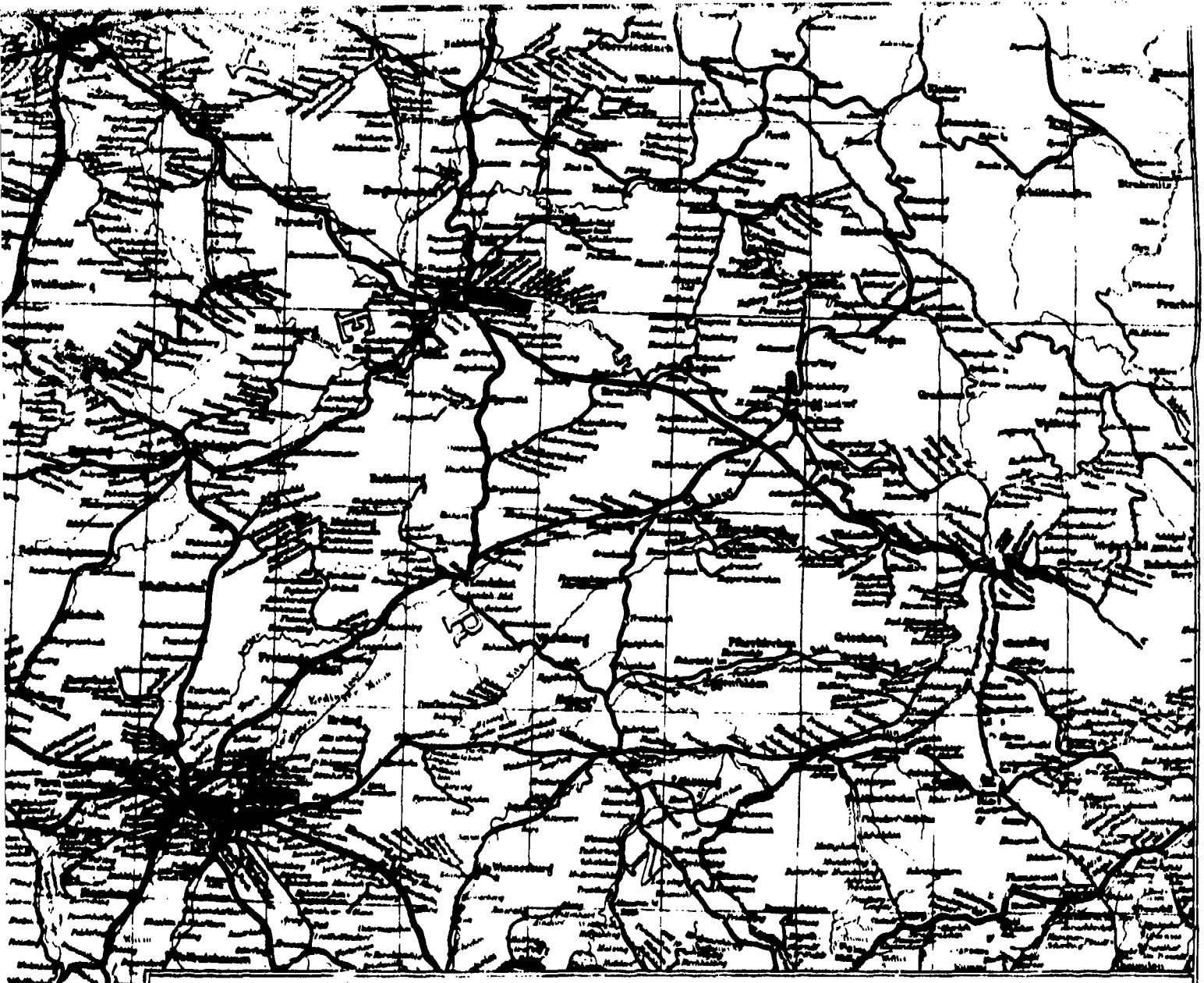




PLAN. 1.




LEG
EXISTING



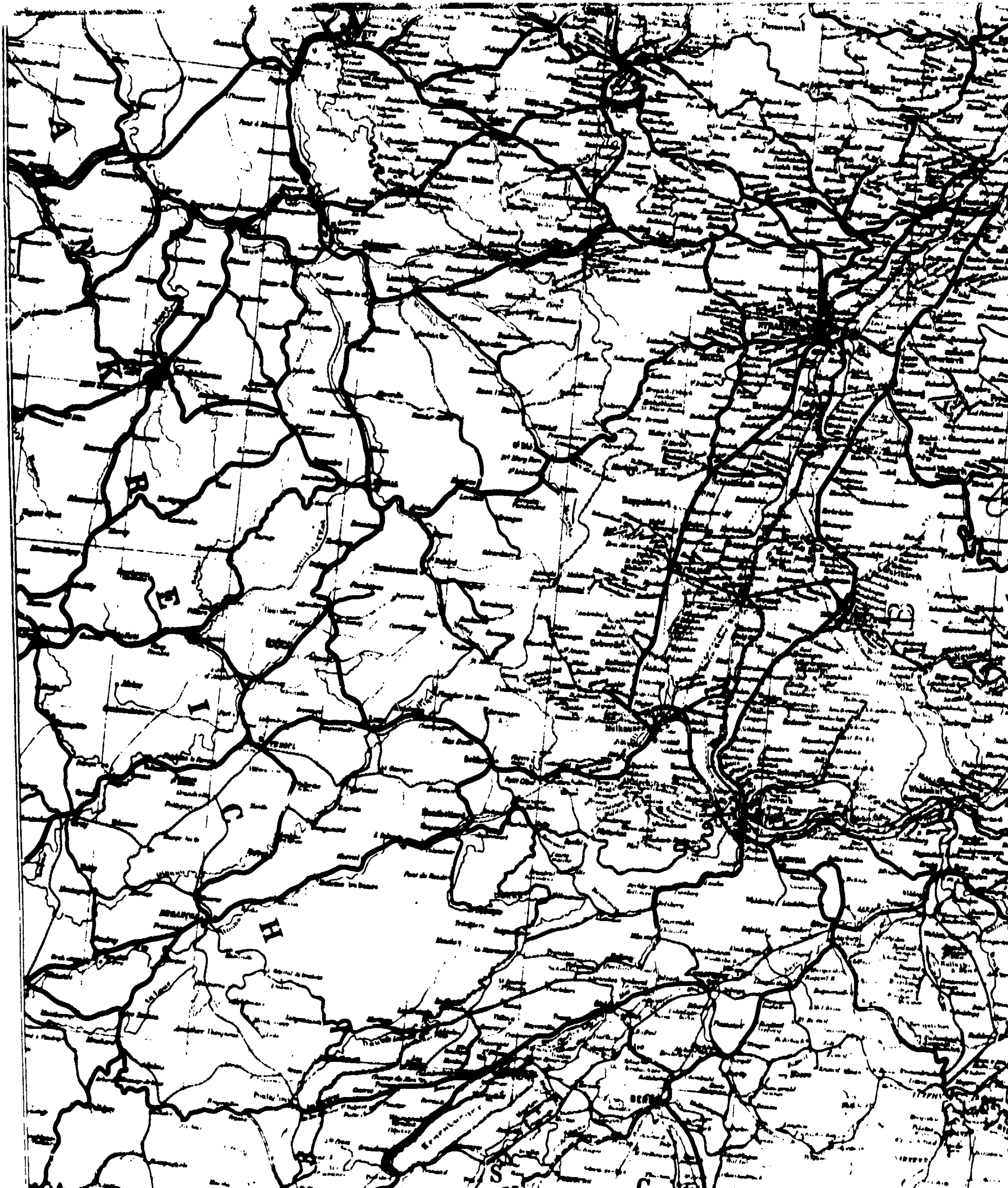
GERMAN RAILWAYS SHEET B

LEGEND

SCALE 1:750,000

Existing	Under Construction	
		4 Track Main Lines
		3 " " "
		2 " " "
		Single Track Main Lines (with second track under construction)
		Single Track Main Lines
		Electrified Lines
		Train Ferry
		Railway operated passenger ferry service
		Important Stations
		Other Stations
		Stations, Halts or Flag Stops
		Independent Marshalling Yards
		" Goods Stations
		Navigable Rivers
		Other Rivers
		Ship Canals
		Canals
		Lakes

Existing	Under Construction	
		2 Track standard gauge Local lines
		Single Track standard gauge Local lines (with second line under construction)
		Single Track standard gauge Local line
		Double Track Narrow gauge
		Single " " "
		Standard gauge light railways or tramways
		Narrow " " " " "
		Reich Capital
		Federal State Capital (Landeshauptstadt)
		Capital of Provinces (Provinzhauptstadt)
		Administrative Centre (Regierungsbezirkshauptstadt)
		Sub-District Centre (Kreisstadt)
		International Boundary (1919)
		Federal State Boundaries
		Provincial Boundaries
		Administrative Districts



Zl A Gr No 19

Received 2/8/00

DEPARTMENT OF DEFENSE
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW
1155 DEFENSE PENTAGON
WASHINGTON, DC 20301-1155

12 JAN 2000

Ref: 98-M-0165/A1

[redacted]

This refers to our letter to you dated October 7, 1999, regarding your appeal to the Information Security Oversight Office for 14 documents previously requested under Mandatory Declassification Review procedures. One document (AD346727) was provided to you by our letter dated November 19, 1999.

The review of 11 British documents you requested is complete and there are no objections to release. Titles of these documents are contained on the enclosed sheet and a copy of each is enclosed. We will advise you as soon as the reviews of the remaining two documents are completed.

Per DTIC letter
Please mark these 11 documents "available to the public"

I requested the docs could be marked available for public release via telecon with Pat Kenney, DoD Security Review, 695-1556/0428. on 4 Jan 2000.

/Kelly Aikens
DTIC-RS

Sincerely,

SIGNED

H. J. McIntyre
Director

AD-036 799
AD-044 992
AD-048 643
AD-057 151
AD-057 524
AD-057 525
AD-057 526
AD-057 527
AD-122 495
AD-136 830
AD-139 544

Received 2/8/2000